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A Step Backward, A Look Forward

By Don Leavitt
Of the CW Staff

SAN JOSE, Calif. – A number of installations are having second thoughts about the IBM 370 – and quietly moving back to the 360. The reasons for the reconversions are varied, but in the case of the San Jose Hospital, the primary consideration was economic.

The hospital was running a 370/135, but replaced it in late January with a 360/50 acquired from Itel. "We're now saving $45,000/year with the 50, even after 'folding in' the payment of the penalty fee required by cancellation of the Term Lease Plan," Bruce Schaeffer, director of management information services for the hospital, explained.

Having moved to the 135 from a 360/30 about two years ago, Schaeffer emphasized he was not at all unhappy with the technical capabilities of the 370 or the support he had received from IBM. But Itel's software, which allowed the hospital to move its DOS/VS workload directly to the 50, now means "everything's the same. It's just a lot cheaper."

That oversimplifies the situation since Itel's technicians were also able to attach its full-speed 3330-equivalent 7330 disk drives to the 50, providing higher speed secondary storage than previously available on that model of the 360 line.

With the reduction in CPU cost, the hospital has replaced the 80K-byte tape drives that were on the 135 with 120K-byte units on the 50. The "new" machine is configured with 256K bytes of core compared to 144K bytes on the 370, Schaeffer noted.

Throughput improvements with this souped-

(Continued on Page 2)

NEWSPAPER

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Interdata Model 8/32

Interdata Puts Out 8/32, Complete 32-Bit Machine

By Vic Farmer
Of the CW Staff

OCEANPORT, N.J. – By converting to 32-bit architecture throughout its Model 8/32 minicomputer, Interdata has come up with a machine it says is four to six times more powerful than its older 7/32 mini at less than double the price.

The addition of this 8/32 machine, however, pretty well sandbags the idea that the 7/32 mini was a real 32-bit machine in anything more than memory addressing and registers.

The 7/32, widely touted as a 32-bit machine, used a mix of 16-, 20- and 32-bit data paths internally, an Interdata source revealed. But the 8/32, according to Interdata, is very nearly a complete 32-bit architectured machine in its internal data paths.

The 8/32 also has an optional four times as many 32-bit registers (eight stacks of 16 registers each) as the 7/32, and the maximum data rate has been boosted to 6M byte/sec over the 7/32's 2M byte/sec.

These two improvements are the key to much higher performance in the use of the 8/32 as a communications front end. The six additional registers, according to Interdata, can be used to handle interrupt processing and to a great extent avoid the need to save and restore the status of the machine on interrupts, especially when using high-speed lines.

The four-way interleaved memory system has an effective 32-bit memory cycle time of 450 nsec. With dual instruction look-ahead stacks, effective 32-bit memory cycle time is further improved to an average 300 nsec, the company said.

The 32-bit architecture currently addresses up to 1M byte of main memory and has the potential eventually to address directly up to 16M bytes of main memory.

Instruction word length is 16-, 32- or 48 bits and data word length is 1-, 8-, 16- or 32 bits. Arithmetic is two's complement. Processor cycle time is 240 nsec, the company said.

(Continued on Page 2)

Since 1971

Median Systems Pay Rises 12%

By Edith Holmes
Of the CW Staff

CLEVELAND – The median salary for systems personnel rose to $18,749 in 1974, an increase of 12% over 1971, despite the fact that federal wage and salary controls were in effect during part of this period, a report recently published by the Association for Systems Management (ASM) found.

But "inflation has also taken its toll," the study, which surveyed the salaries, job characteristics and levels of responsibilities of systems analysis, said. "Although the median salary increases from 1969 to 1974 represent 24%, the 1969 dollar has eroded 25% and is still shrinking."

Nevertheless, nearly 90% of systems people polled said they earned at least $15,000, and more than half reported they made $20,000 or more, the study noted.

The number of systems personnel in the two upper-limit salary categories – $20,000 to $24,999 and $25,000 and over – has doubled since 1971, while 10% still earn less than $10,000.

Based on responses from over 4,000 systems practitioners, "Profile of the Systems Professional – Salaries and Activities" cuts across a wide variety of industries, including manufacturing; insurance or financial; trading, wholesale or retail; public utility and transportation; government; education; and service, consultant or accounting firms.

The report noted the industry distribution of those responding to the ASM questionnaire paralleled its 1971 statistics.

"The slight decline in service-oriented companies may be an accurate barometer of the economic pressures causing companies to perform more of their systems work in-house," the study said, adding that "the upper salary limits for the service industry had the smallest percent of increase," anywhere from 7% to 9%.

By combining percentages of the respondents who receive $15,000 or more within each type of company, the report concluded systems people in the insurance, financial and education industries "have the greatest handicap" in receiving this median salary, while those in government "have the best opportunity."

(Continued on Page 3)

Police Chief Suspected Of Altering Own Record

By Nancy French
Of the CW Staff

CINCINNATI – County officials are investigating reports a township police chief may have altered his own driving record through a terminal of the region's law enforcement computer network.

The act was discovered during a routine inspection of a printout at a terminal where the reckless driving offense belonging to Symmes Township Police Chief James Tygrett was originally entered, Andrews O. Atkinson, superintendent of the regional computer center, explained. He declined, however, to say where the terminal was located.

Atkinson did say the system's first line of security defense doesn't permit records entered by one agency to be canceled or altered by another without noting the change automatically at the terminal in the agency where the record was entered. The terminal, date and time the change was made are included.

The terminal is part of the County Law Enforcement Applied Regionally (Clear), a shared system and one therefore not qualified for membership in the National Crime Information Center (NCIC) operated by the Federal Bureau of Investigation

(Continued on Page 2)

Mass. Official Acts on Privacy Law

By Nancy French
Of the CW Staff

BOSTON – In what is believed to be the first application of the Privacy Act of 1974, the Massachusetts attorney general has ruled that requiring applicants for drivers' licenses to provide their Social Security number is a violation of the new federal law.

Accordingly, Gov. Michael S. Dukakis has ordered the Massachusetts Registry of Motor Vehicles to provide alternate numbers for all new license applicants and for any renewal applicants who wish them.

The registry, however, will be permitted to maintain its previous numbering system for any of the state's three million drivers who do not object.

The federal law limits use of the Social Security number by federal, state and local governments to cases where disclosure of the number was required under statute or regulation adopted prior to Jan. 1, 1975.

The registry, Attorney General Francis X. Bellotti informed the governor, has no such federal or state statutory authorization to require a driver to provide his Social Security number. To continue to do so would be a violation of federal law, Bellotti warned.

Registry officials disputed Bellotti's statement to Dukakis on the basis of a 1972 Supreme Judicial Court ruling that mandatory collection of the number by the registry was not an invasion of personal property.

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Please address all correspondence to the appropriate department at 797 Washington Street, Newton, Mass. 02160. Phone: (617) 965-5800. Telex: 92-2529.

OTHER EDITORIAL OFFICES: Los Angeles: 963 N. Edgecliffe Drive, 90026. Phone: (213) 665-6008. **England:** Computerworld, c/o IDC Europa, Ltd., 140-146 Camden Street, London NW1 9PF. Phone: (01) 485-2248/9. **W. Germany:** Computerworld, c/o Computerwöche GmbH, (8) München 40, Tristanstrasse 11. Phone: 36-40-36/37. Telex: 5215350. **Asia:** Computerworld, c/o Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101. Telex: 26792.

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And Saves $45,000/Year

Hospital Takes Step Backward to 360

(Continued from Page 1)
up 50 are expected to be about 25% compared to the 135. But that's probably conservative, Schaeffer thought, "since some things are certainly going to get better as we get smarter."

Right now, some jobs that used to run an hour are getting done in 45 minutes, "and that's without changing core allocations or anything from the 370 environment. The fact is, we have more core to play with and we expect to improve that further" with more effective I/O blocking and similar modifications, the director said.

No Program Conversions

There was no need for any kind of program conversion, he added. "We lifted the code – the entire job stream – off the 135 and ran the same stuff on the 50." Having that simple a transfer was due in large part to Itel's operating system, which simulates VS. The 135 was under DOS/VS Release 29.

"Itel has an equivalent version that does all the same things but eliminates a lot of paging," Schaeffer said.

The Itel software even simulates the execution of any 370 instructions that might be in a user's programs, the hospital's DP manager, Robert Albey, noted. "Therefore we had code compatibility; throughput was there, and there were no limitations on program options and things like that."

That sounded good, he said, but just to be sure, the hospital ran a benchmark on a 50 installed at Itel, before final commitment was made. The test was a whopper, according to Albey.

"We decided to use our normal daily production cycle of batch work, which runs from midnight to about 8 a.m. We took the one we had just run in-house, reproduced the original files and then let it run," he said.

"We reran the job stream with some compiles, a few sorts outside the normal production work, but essentially it was our normal job mix."

Quick Changeover

While the testing was good, the actual physical changeover was even more impressive to Schaeffer. "We gave Itel the 135 at about 10 a.m. Friday – we were back in the shop, running on the 50, by 6 o'clock Sunday evening."

Along with the moving of equipment, including the addition of various control units that hadn't been needed with the Integrated File Adapter on the 135, the work that weekend included installation of a raised floor to accommodate cabling. And that was all done in the 56 hours the DP center was out of the hospital's hands.

Since a hospital can't stop work while its DP center is out of action, Schaeffer had the regular work – including on-line processing under the Swift monitor – routed through to Itel's 50 over in Palo Alto.

The hospital had to run month-end work almost immediately after its 50 was up and, since that went without a hitch, Albey and Schaeffer are both optimistic about anything else they might have to tackle.

Interdata Brings Out 8/32 Mini

(Continued from Page 1)
Main memory for the 8/32 consists of 32K-byte modules of 750-nsec core with four-way interleaved memory paths. Each 16-bit-wide memory module runs independently: the processor can thus begin a read cycle in one module and, without waiting for its completion, begin another read cycle in a different module.

On the assumption most instructions are stored in sequential addresses, the memory system anticipates the processor's requests and answers them in the dual 64-bit instruction look-ahead stacks.

The Memory Access and Protect Controller (MAC) offers memory protection and dynamic memory relocation when the 8/32 is running under the real-time, multitasking operating system, OS/32-MT. The 8/32 is designed to accept both core and semiconductor memory systems, or a combination of the two, but only core is being offered, the company said.

Interdata claims instruction execution times for the 8/32 are comparable with those for a traditional large mainframe computer system such as the IBM 370/158.

The Direct Memory Access (DMA) bus has three modes of operation, two more than on the 7/32: half-word mode of 2M byte/sec; full-word mode of 3.2M byte/sec; and burst mode of 6M byte/sec.

The DMA bus can have up to seven selector channels, with each channel supporting up to 16 high-speed block transfer devices, the company said.

Software compatibility across the firm's 32-bit and 16-bit mini lines is achieved through the Common Assembly Language (CAL), which is said to allow the writing of common source code that can be assembled for either 16- or 32-bit Interdata machines.

With 128K bytes of memory, the 8/32 is priced at $51,900. With 1M byte of memory, it costs $179,400. Production deliveries will begin in June.

The company is at 2 Crescent Place, 07757.

Ohio Police Chief Under Suspicion

(Continued from Page 1)
in Washington.

Ironically, if the county belonged to NCIC and observed that federal agency's security standards, the tampering could have gone undiscovered, Atkinson pointed out.

"NCIC's only security requirement is a dedicated rather than a shared system," he said, making systems like Clear ineligible for participation in that nationwide system. But "NCIC security standards say nothing of security checks and audit trails," Atkinson said.

Different Terminal

Under Clear, a police department such as Symmes Township has the capacity only to receive information via Western Union receive-only teletypewriters. Arrest charges and other information Symmes police may wish to enter into the system must be added through another type of terminal, such as the Courier 165s at the county level and in the courts. About 90 terminals are tied in with the county's RCA Spectra 70/60 system.

Tygrett denied having anything to do with deleting the reckless driving ticket and asked, "Why would I want to do that?" The ticket he received in nearby Delhi Township "did not jeopardize" his driving status.

In addition, duplicate records of the arrest are on file in both Delhi and Columbus, the state capital, he noted.

Willing to Take Test

"Anyone who has access to the computer can delete any record he wants," Tygrett said. He added he would be willing to take a lie detector test to show he was telling the truth.

The investigation is still under way.

Although Clear is not a formal member of the NCIC, Clear member agencies are permitted to request and submit information to that system. In addition, through the National Law Enforcement Telecommunications System (Nlets), Clear agencies have access to the Midwest's Automated Law Enforcement Communications Systems (Alecs) and the Ohio Bureau of Motor Vehicle's Law Enforcement Automated Data System (Leads).

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Median Systems Salary, Up 12%, Rises to $18,749

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The ASM report pointed out the Midwest has consistently accounted for the large percentage of the total number of systems personnel employed, holding one-third of that total ever since 1959.

And 'geographical location seems to have a significant influence on salaries received," the study noted. Its figures showed the Southwest and Canada afford the least opportunity for reaching into the $20,000-and-over salary range.

Meanwhile, half of the respondents from the Northeast, Southeast, Midwest and Western regions "indicated they were paid $20,000 or more." ASM added, however, that differences in the cost of living in these various areas probably offset the differences in salary.

Experience Increasing

As in previous years, those answering the ASM questionnaire were increasingly experienced. In 1974, 14% said they had more than 20 years of systems work.

"Correspondingly, the percentage of respondents with less than 10 years of experience continues to decline since the 1959 survey," dropping from 67% to 38%, the report stated.

"Much of the experience accumulated has come from employment in many companies," the study went on, but added "the steady increases that have occurred in the proportion of respondents who have worked in three or more companies appear to have stabilized."

This, ASM contended, reflects a steadying of the systems function since its rapid growth during the 1960s.

As might be expected, the survey indicated "salaries are a direct function of systems experience.

"While the respondents with up to three years of systems work have a modal [median] salary of just under $17,000, those with 20 or more years of experience have a modal salary of nearly $25,000," the report said.

Systems experience is acquired in a wide variety of functional areas within the organization. Six areas – finance and/or accounting; general administration; purchasing, materials management and inventory control; manufacturing and/or production; sales, marketing and advertising; and personnel and industrial relations – account for 82% of the activities of the systems person, according to the report.

"The systems specialist is indeed a generalist," AMS said.

More than two-thirds of the respondents indicated they had attained at least an undergraduate degree. Of this college-educated group, the report noted 28% earned a master's or doctoral degree and another 26% engaged in post-graduate college work.

The number of systems people having no formal college education has declined slightly, the study added.

"The college student preparing for a systems career may specialize in many fields," the survey found. Fewer are concentrating in accounting, however, opting instead for engineering, science and liberal arts courses.

And the study said that, for the past three surveys, nearly 40% of the respondents received their systems training in business administration programs.

One-half of all respondents indicating no college preparation receive at least $17,500, while nearly two-thirds of those with undergraduate degrees receive this amount or more and half earn in excess of $20,000 the report commented.

"The systems 'whiz kids' of the 1960s have moved into the older age brackets but have been replaced by an even larger percentage under age 29 who are attracted to a systems career," ASM found.

"Today nearly half of those working in systems are 40 or more years of age while the modal range of 30 to 39 had remained unchanged since 1959.

"Youth is no deterrent to earning $25,000 or more in systems," the report indicated, but added "it is the 40 to 60 age group that is most represented in the higher salary brackets."

While systems people "seem to have as many titles as there are areas of activity," approximately half of the respondents have managerial titles while another 23% are designated analysts.

About three-fourths of the occupations supervised by systems personnel are computer-related, reenforcing their managerial status, the report said.

As has been the case for the last 10 years, the majority of systems departments employ fewer than 10 people. But ASM hastened to add "this entire survey indicates that, although often a small department, the systems team is one of the most influential in a company."

Of the systems personnel surveyed, 74% report to their company's president, executive vice-president, activity vice-president, treasurer or controller, the report said.

A total of 80% of the respondents commented they devote three-fourths of their time to systems work, but those who spend less than 25% of their time on systems projects receive salaries comparable to those who work at these projects 75% of the time.

Finally, the study found most systems personnel do not require much travel to perform their jobs. "The increasing use of data communications equipment has made the systems function more centralized," it said.

Available for $6, the survey can be obtained from ASM here at 24587 Bagley Road, 44138.

Mass. Official Acts On 1974 Privacy Act

(Continued from Page 1)

The registry's only authorization to require drivers to provide their Social Security numbers appears in a 1967 administrative memo which states that "no license application is to be processed if the licensee refuses to give a Social Security number, although one has been assigned to him."

Subsequently, the registry converted its license number system to use the Social Security number except in cases where a person, such as an alien, had none.

The practice of using the Social Security number on items like drivers' licenses, charge account applications and public school records has long been opposed by privacy advocates.

In fact, the use of the Social Security number for other than its original purpose has been criticized by the U.S. Health, Education and Welfare Department's Committee on Automated Personal Data Systems and by many lawmakers who sponsored the various privacy bills last year.

The moratorium on the use of the Social Security number became law on Dec. 27 when the Privacy Act of 1974 was signed by President Gerald R. Ford.

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Computer Caravan Told

Small Shops Need Priority Procedures

By Nancy French
Of the CW Staff

HARTFORD, Conn. – "Most of the problems one finds in a small DP shop arise from accepting work you know you can't do," John Newman, DP manager for the Moore Co., a division of Easco, told a Computer Caravan workshop here last week.

"While the DP manager in the average company may report to the vice-president of finance on the organization chart, in actuality he has many bosses vying for his time and services – from the vice-president of sales to the vice-president of personnel," Newman pointed out. And each vice-president is interested in only one thing – When can I get my report," he added.

"If your company has no clearcut procedures for setting priorities and, instead leaves that responsibility up to you, the DP manager, you're in trouble," he told workshop attendees.

Newman suggested two methods for solving the DP priorities problem – first, the ability to call on the company president directly to reestablish priorities from time to time, and second, the steering committee approach. Here all the company's vice presidents sit down together as members of a committee and, with all the company's interests represented, thrash out the logical DP priorities, he explained.

The problem of getting everyone his report when he wants it with the limited facilities and manpower available in the small shop is compounded by the personnel problem – how to keep employees happy, how to keep them at all and how to be sure the shop can still function when a key person leaves, Newman commented.

This can be managed by taking pains to provide opportunities for advancement, outside training and salaries commensurate to the work staff members do, he said.

Defining a small shop as one with a staff smaller than 15 people, Newman suggested first creating "an atmosphere of competition by doing away with titles" that set employee status in concrete, with no upward mobility apparent.

Projects should be run on a team basis so several people are familiar with each program. This protects the operation if someone leaves.

"Even if you have only two programmers, this is essential," Newman said – and "if you have only two it's all the more important," he remarked in an informal discussion with Caravan attendees following his presentation.

"A problem that often develops in a small shop is that your only systems programmer – that guy who put up your system – becomes well known and sought after in the marketplace.

"If you can't pay him what he's worth in the marketplace, you're going to lose him. You must be able to give him the raises he deserves as well as the training he wants to keep him in your shop."

Newman suggested that where training dollars are limited, "if you have six analyst/programmers and money for six courses, send a different person to each course." Then, when each one comes back, have that person teach the other five what he learned.

"We talk a lot about this," he said, "but if you don't allocate a specific time for it, like every Wednesday afternoon for two hours, for example, the system won't work.

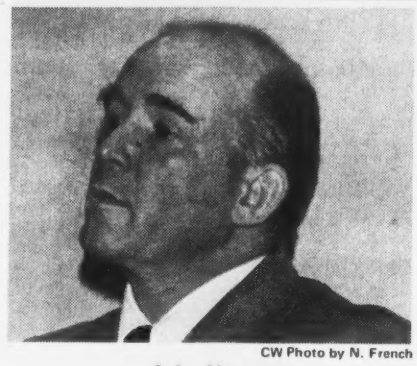
"Strive as much as possible for equal training. If you don't," he said, "nothing will be worse than having your key man disappear, for whatever reason."

Even if the position can be filled, a shop will only get 50% efficiency from the new person, and it will be some time before he reaches the 98% efficiency the old employee attained, he said.

And to make upward mobility and career pathing a reality in a small shop, "promote from within wherever possible," Newman admonished.

"Operators should be encouraged to get programmer training; most companies even pay for it," he said. "When an operator begins to show talent, let him do some simple programming on the third shift."

"And maintenance, something your analyst/programmers don't particularly want to do, may look pretty interesting to the operator who wants to get ahead," he said.



CW Photo by N. French
John Newman

Complexity 'Enemy' Of Future DP: Grace

By a CW Staff Writer

HARTFORD, Conn. – Why continue to design expensive software to do simple arithmetic on a time-sharing system when a cheap desk calculator will do the job as well?

So asked Dr. Lon Grace, chief computer scientist at Travelers Insurance Co. here, when he spoke to attendees of last week's Computer Caravan.

Discounting the DP community's hang-up with efficiency, Grace compared the third-generation computer to a Swiss army knife – "an implement that is pretty good at a lot of things, but really good at nothing. The only difference between the two is price," he said.

Grace said tomorrow's solutions lie in simplicity, not complexity. "Complexity is our enemy," he said, pointing out there are a lot of people around who seem to like complexity for its own sake.

"The time has come to take problems in hand and apply top-down management rather than managing things from the inside out, as we have done in the past. Management is the key," he said.

Grace told attendees that to date most of them have only faced the relatively simple task of getting small programming teams to work together successfully.

Tomorrow, however, they may face bigger problems, such as getting "hoards of people to work together.

"You do it by structuring the organization and managing it," he said.

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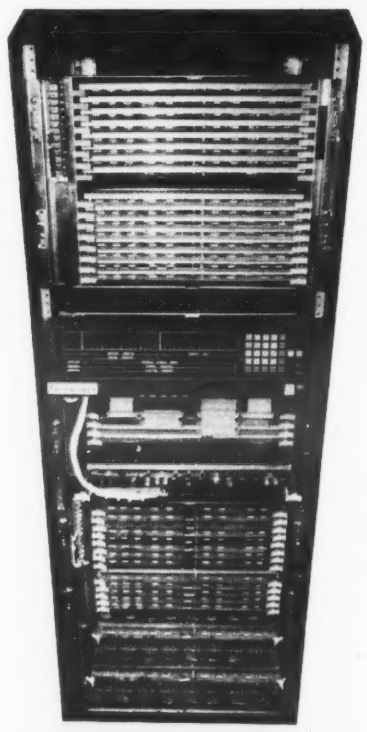

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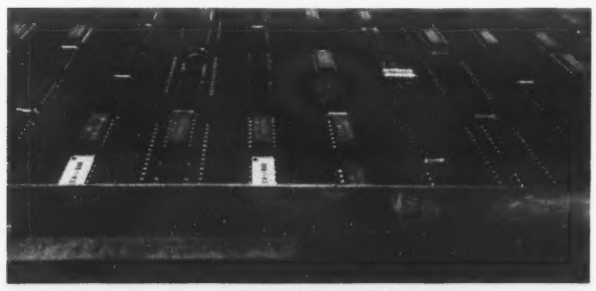

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OMB Drafting Regulations to Implement Privacy Law

By Nancy French
Of the CW Staff

WASHINGTON, D.C. – An Office of Management and Budget (OMB) team is drafting regulations to guide its various departments in implementing the provisions of the new federal privacy legislation.

"We've been working nights and weekends," according to Walter Haase, OMB deputy director for information systems. Interim guidelines already have been issued to all federal agencies with advice to move ahead with their own regulations until more formal guidelines are issued, he added.

The process is taking time because there are many areas in which the privacy law appears to conflict with existing laws such as the Federal Reports Act, the Freedom of Information Act and the general direction of program evaluation and statistical reporting.

"We're addressing these issues piece by piece and that is what is taking the time," Haase said.

While officials at the Department of Health, Education and Welfare (HEW) have received the initial OMB memo, they say they can't do much at all until final OMB guidelines are in their hands.

The department with probably the largest number of personal information files, HEW has established a fair information practices office to administer privacy-oriented procedures.

"We are reluctant to march down the road and implement any new procedures until OMB defines the metes and bounds of the law for the whole government. We could charge off and, when OMB guidance came in, find out we're way out of step," Ed Gleiman of the secretary's Fair Information Practices Office said.

Douglas Metz, acting executive director of the Domestic Council Committee on the Right of Privacy, said he is satisfied there is an earnest effort to get the regulations drafted for agency comment.

Several versions of the regulations will probably be circulated before a final set of regulations is approved, according to Metz, and that will take some time.

No appointments have been made to the Privacy Commission, but "conversations are going on in the White House about it," Haase said. Half the members will be selected by the President and half by Congress.

Congressional action has been delayed by the still-unsettled question of congressional oversight, but a source said a decision will be made this week to give oversight on the Senate side to the Intergovernmental Relations Subcommittee of the Senate Government Operations Committee, headed by Edmund Muskie, (D-Maine).

In the House, responsibility will go to the Government Operations Committee's newly established Subcommittee on Government Information and Individual Rights, headed by Bella Abzug, (D-N.Y.), the same individual explained.

Justice Agrees to Stop System Feeding Civilian Data to CIA, IRS

WASHINGTON, D.C. – The Justice Department has agreed to deactivate the computerized intelligence system that fed data on civilians to the Central Intelligence Agency (CIA) and the Internal Revenue Service (IRS).

U.S. Attorney General Edward H. Levi announced the decision in a letter to Sen. John V. Tunney (D-Calif.), newly appointed chairman of the Senate Judiciary Committee's Subcommittee on Constitutional Rights, saying the Interdivisional Intelligence System (Idis) files would be locked up and "rendered inaccessible for operational use.

"I can foresee no circumstances at this time under which the manual or automatic Idis would be reactivated, but if during my tenure as Attorney General, circumstances should arise that would suggest system reactivation, I will inform you in sufficient time to permit a full exchange of view," he said.

The Idis and its predecessors have been a matter of concern to the subcommittee since the late '60s. During the 1971 hearings on federal data banks, computers and the Bill of Rights, Justice Department officials maintained the intelligence program was "benign but essential to preserving order."

The Idis "shall be responsible for reviewing and reducing to quickly retrievable form all information . . . relating to organizations and individuals throughout the country who may play a role, whether purposefully or not, either in instigating or spreading civil disorders or in preventing or checking them," testified then-Assistant Attorney General Robert C. Mardian.

Despite assurances the Idis was nothing more than a "clipping service" and used only on a "need-to-know" basis, the data was circulated within the intelligence community and was recently discovered in the CIA's domestic intelligence office and in the office of the Special Service Staff of the IRS, Tunney said.

"A review of the Idis printout by the subcommittee staff confirmed our worst fears about this data bank. The file contained massive irrelevant information on individuals guilty of nothing more than exercising their First Amendment rights," Tunney said.

Subcommittee members "were shocked when we learned last August the Justice Department was attempting to secure additional computer capability in order to expand the Idis," he added.

"The deactivation of the Idis is an important first step in the overall program review of data systems and their possible abuse which the Attorney General has announced for the Justice Department," Tunney said.

ACPA Opposes Licensing

WASHINGTON, D.C. – The Association of Computer Programmers and Analysts (ACPA) has released a statement opposing the recent proposal by the Society of Certified Data Processors (SCDP) requiring that DP professionals be licensed.

ACPA asserted its continuing support of comprehensive, voluntary certification programs, but it said it will "actively oppose any proposal supporting mandatory licensing" which it feels "would limit the individual practitioner's freedom to practice" his profession.

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Integer Add	1.25	1.8	.9	1.8	2.5
Multiply	3.54	6.2	2.0	3.9	8.8
Divide	5.8	14.4	9.9	8.3	11.2
Floating Point Add	2.3	6.1	2.4	8.25	5.5
Multiply	3.0	9.1	2.3	11.25	7.2
Divide	5.35	23.3	8.9	12.25	7.9
HARDWARE I/O	Yes	Yes	Yes	No	No
MAX. DMA RATE/SECOND	6MB	4MB	6.7MB	4MB	2MB
MAX. ADDRESS CAPABILITY	1MB	1MB	16MB	64KB	64KB
GENERAL PURPOSE REGISTERS	8 stacks 16 each	4 stacks 16 each	1 stack 16 each	2 stacks 8 each	1 stack 4 each
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FASB Clarifies October Ruling Defining Software Costs as R&D

By Molly Upton
Of the CW Staff

STAMFORD, Conn. – When must service firms consider software development an R&D cost for accounting purposes?

In issuing its *Interpretation No. 6* last month, the Financial Accounting Standards Board (FASB) shed some light on this question – an area that has puzzled service firms as well as users ever since a brief mention of software development appeared in the board's *Statement of Financial Accounting Standards No. 2* last October.

Basically the board's interpretation adheres closely to the terse statement in its original edict: The purpose of the software determines whether it is to be accounted for as an R&D cost.

Costs incurred to acquire or develop software that is to be used in an enterprise's selling and administrative activities are not R&D costs, the board stated.

But all costs incurred to develop software internally for use in the enterprise's R&D activities are R&D costs, the interpretation added.

Under the board's October ruling, R&D costs must be expensed as incurred.

Costs incurred to purchase or lease software developed by others are not R&D costs unless the software is for use in R&D activities, the board said. When software is purchased for R&D activities, it is to be charged to expense as incurred unless the software has alternative future uses.

In explaining accounting for software developed as a product to be sold, leased or otherwise marketed, the board distinguished between improvement of existing products or procedures and the R&D required to create new ones.

The key phrases apparently synonymous with R&D are "a new or significantly improved product or process" and "the search for or the evaluation of product or process alternatives or the design of a preproduction model."

The ruling said "if the development of software is undertaken to create a new or significantly improved product or process without any contractual arrangement, costs incurred for conceptual formulation or the translation of knowledge into a design would be R&D costs.

"Other costs, including those incurred for programming and testing software, are R&D costs when incurred in the search for or the evaluation of product or process alternatives or in the design of a preproduction model.

"On the other hand," the ruling continued, "costs for programming and testing are not R&D costs when incurred, for example, in routine or other ongoing efforts to improve an existing product or adapt a product to a particular requirement or customer's need."

Applies to T/S, Service Bureaus

The board explained that, since the term "product" also includes services, the ruling applies to costs incurred in developing software to be used by DP service bureaus or time-sharing firms.

The same criteria applies to development of software as part of a product, for example software for a computerized typesetting system.

But despite any of these fine distinctions, a firm developing or "significantly" improving a product or process that is intended to be sold, leased or otherwise marketed to others must attribute these costs to R&D expenses.

Accounting for the cost of development software for others under a contractual arrangement is beyond the scope of the FASB Statement No. 2, the booklet pointed out.

The new interpretations are effective for fiscal years beginning on or after April 1, 1975, although earlier application was encouraged.

Copies of the interpretation are available for 50 cents from the Publications Division of the FASB at High Ridge Park, 06905.

System Aids Cyclone Victims

Special to Computerworld

SYDNEY, Australia – A computer helped keep track of 15,000 evacuees from Darwin, the city devastated by a cyclone on Christmas Day.

The Univac 9400 at Sydney Police Headquarters was used to compile a file of personal information on the evacuees that was used by welfare services and others involved in the evacuation of Darwin.

The department also installed 35 telephones to handle inquiries and assist the evacuees.

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News Wrapup

Catamore-IBM Trial Begins

PROVIDENCE, R.I. – Catamore Enterprises, Inc. and IBM went to trial last week, following the selection of an all-male jury.

After some preliminary maneuvering, Edward F. Hindle, an attorney with the Providence law firm of Edwards & Angell, presented IBM's opening statements, detailing a saga of accumulated unpaid bills for systems engineering services and machine rental.

IBM brought suit against Catamore, a jewelry maker, for unpaid bills amounting to $68,453.

Catamore then countersued, charging fraud and intentional misrepresentation. The countercharges ask damages of $15 million.

Hindle presented for evidence 12 documents consisting of agreements between IBM and Catamore for services, machine rental and billing procedures.

Cross-examination by Catamore's attorney, Thomas K. Christo, was limited to the testimony of the administrative manager of IBM's Providence branch office since June 1970, who acted as custodian of the documents presented by Hindle.

Federal District Court Judge Raymond J. Pettine sustained Hindle's objections on questions of interpretations of regular IBM practice regarding such documents.

Catamore contracted for an IBM system on Sept. 16, 1968. The agreement was signed by a corporate IBM representative Feb. 16, 1969, although the document had been identified as received by the branch office in September.

Pettine denied Christo's motion to subpoena several IBM officers. He reenforced his pretrial statements, however, in which he said he would allow depositions from these men if the need for them arose.

Pettine granted Hindle permission to subpoena work papers produced by Catamore's accounting firm, Arthur Young, for inspection by IBM accountants, Price Waterhouse. The work papers would be used for cross-examination, Pettine noted.

Utah Puts Temporary Lid on EFTS

SALT LAKE CITY, Utah – The Utah Senate has voted unanimously to place a moratorium on customer-activated electronic funds transfer systems (EFTS) until July 1, 1976.

Utah bankers who proposed the bill are concerned EFTS might allow out-of-state banks to "in effect set up branch operations in Utah without going through the process of asking for a charter," noted Sen. Warren E. Pugh (R-Salt Lake City), who sponsored the bill.

The delay would allow bankers time to see if that concern is warranted, he said. It would also give the state's Department of Business Regulation more time to study EFTS and write regulations governing it, he added.

Under the bill, banks can test or experiment with EFTS during the moratorium period as long as they work under the direction of the state's commissioner of financial institutions, Pugh noted.

However, they cannot implement "permanent" or "full-fledged" EFTS until the moratorium comes to an end.

The bill originally called for a two-year moratorium, he mentioned.

Pugh said the bill passed the Senate without a dissenting vote. If it passes the House and wins the governor's approval, as Pugh expects, the bill will take effect in May.

N.Y. Court Requiring Certified Printouts

BUFFALO, N.Y. – After learning a defendant in a drunk driving case had been permitted to plead guilty to reduced charges because a phony computer printout showed no previous moving violations, the city court here is requiring all printouts be certified by the issuing agency before using them in court.

The new procedure was ordered after *The Buffalo Evening News* discovered the computer, which was supposed to have provided the defendant's driving record, had been asked the wrong question by an "unknown" person at a "mysterious" computer terminal, according to police.

The defendant, arrested after a fatal accident, had refused to submit to a blood alcohol test.

To produce the printout the defendant presented to the district attorney – one which did not reflect his traffic violations – the system must have been asked to print out the identity of the owner of the car rather than the owner's driving record, according to Assistant District Attorney William J. Ragan.

Computer printouts are not accepted as evidence, but are often used here by district attorneys in deciding whether a suspect with a clean record might be permitted to be tried for lesser charges in traffic cases.

In the future, computer printouts must be stamped, dated and initialed by the terminal operator in the police installation receiving the requested information from the state or the National Crime Information Center.

In the case in question, the defendant entered a guilty plea to a lesser charge of driving while impaired by alcohol.

While the defendant actually had two previous accidents within a two-month period and had been convicted on a speeding charge, none of this data appeared on the printout.

The judge reviewed the phony document containing no previous convictions or accidents and imposed the minimum $50 fine.

Automated Payments Concern Canadians

OTTAWA – Canadians should be concerned about the move toward automated payment systems, according to the Law Reform Commission here.

The commission's recently released study paper, "The Canadian Payment System and the Computer: Issues for Law Reform," reviewed the changes in business practices which have led to restructuring the payments system, especially with the advent of electronic funds transfer systems and the increasing use of credit cards.

The commission said consumers' interests must be fully protected in developing plans for a checkless society.

The commission said it considers public participation in formulating a new payments policy crucial and thinks future payments systems will seriously affect the rights of the individual.

The study noted that, because consumers have never shown an interest in the issues surrounding credit transactions, banks and other financial institutions have been free to dictate the terms upon which they will accept accounts.

The Canadian government has already responded to many of the suggestions and has taken steps in cooperation with the Canadian chartered banks "to ensure the orderly development of the payments system." The commission is cooperating with government agencies in this area to guarantee the issues highlighted in the study paper are fully considered.

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51 Mfg Sales Representative
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70 Lawyer/Accountant
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Hearings Expected to Begin Soon

House to Consider Bills on Criminal Justice Systems

By Nancy French
Of the CW Staff

WASHINGTON, D.C. – The House of Representatives will once again consider legislation to guarantee the security, accuracy and confidentiality of criminal justice information at the federal as well as state and local levels, with hearings on two proposed bills expected later this month.

The latest bill, H.R. 61, which has the endorsement of the Justice Department, was introduced by Rep. Don Edwards (D-Calif.) and has been referred to the subcommittee he chairs – Civil Rights and Constitutional Rights of the House Judiciary Committee.

The key difference between H.R. 61 and the Ervin bill (H.R. 62), also introduced by Edwards this session [CW, Feb. 5], is in the enforcement provisions.

The Ervin bill calls for a commission that would control the manner in which local law enforcement agencies implement and observe the law.

H.R. 61, on the other hand, simply spells out standards, leaving authority for implementation and operational control in the hands of local criminal justice agencies.

The role of the commission proposed in H.R. 61 would be principally to collect data about systems in operation, study systems in operation and recommend future legislation.

Arrest Records

The bill would require law enforcement agencies to "adopt procedures reasonably designed" to assure arrest records accessed to develop investigative leads do not influence police officers in making subsequent arrests.

In a case where arrest record information is obtained from another criminal justice agency, the requesting agency must keep a record for three years that identifies the requesting officer, the information obtained, the purpose of the request and its use.

Access to automated criminal justice information would be permitted only by specific identification number or other accurate identifier such as fingerprints.

The law would require records be kept each time patrol units using automated systems are given access to arrest or criminal record information. The record would identify the requesting officer, what information was obtained and the purpose and use of the information.

It also would require criminal justice agencies to adopt procedures to insure confidentiality of criminal history information released for statistical purposes and provide sanctions for those who violate the terms under which the information was released.

In cases where criminal records would have a bearing on employment by a criminal justice agency or other federal, state or local government agency, criminal history information on an individual may be disseminated.

Security, Accuracy and Timeliness

Individual agencies would be responsible for following each arrest with a note of disposition within a maximum of 90 days after it has occurred. The agency would also be responsible for security, accuracy and timeliness of all records.

Further, each agency must assure corrections and deletions pertinent to the original arrest record be "promptly" disseminated to those who have received it.

However, the bill would exempt from the law all criminal justice information systems in effect prior to the effective date of the law if implementation is "not feasible."

Purging and Sealing

A federal or state criminal justice agency shall adopt procedures "reasonably designed" to ensure arrest record information is expunged if there has been no subsequent arrest after five years and the individual is not a fugitive.

Criminal justice agencies would be required to establish procedures that allow an individual, upon satisfactory identification, to inspect in person or through his counsel his criminal records.

Correction would be made "expeditiously" in cases where there is no factual dispute, and, in cases where a dispute exists concerning a portion of the records, the agency would refer the challenge to the agency that originally collected the information.

If the dispute were still not resolved, a hearing would have to be provided where the individual may appear with counsel, present evidence and examine and cross-examine witnesses.

Any information found to be inaccurate after the hearings would be appropriately corrected or deleted.

Intelligence and investigative information would be collected only for official purposes and would be excluded from criminal record files, according to the bill.

Computer terminals that access other criminal information would be forbidden access to investigative information, except in cases where the information is maintained in a single department for use by several agencies.

However, "an assessment of criminal justice intelligence information would be provided to any individual when necessary to avoid possible danger to persons or property," according to the bill.

An agency employee who discloses criminal justice investigative information to which he has had access to a person not authorized by law to receive such information would be punished by imprisonment not to exceed one year or a fine not to exceed $10,000 or both.

S.C. Now Only State Without Privacy Law

WASHINGTON, D.C. – Every state in the nation but one now has at least one law limiting disclosure of personal information, according to a recent survey by *Privacy Journal*, a Washington monthly newsletter.

The survey showed only South Carolina has not passed legislation protecting privacy in at least one of the following areas: medical and school records, wiretaps and polygraphs, arrest records, criminal justice information systems, Social Security numbers, tax records, credit reporting, personal data banks and bank records.

Only Minnesota has passed broad-based privacy legislation granting citizens a right of access to government files about themselves, the right to correct a file and the assurance that disclosure to third parties is limited, the report said. Similar "fair information practices acts" have been proposed in six other states.

The survey results are available for $10 from the newsletter at P.O. Box 8844, 20003.

Free Security Guide Advises Executives

WASHINGTON, D.C. – A pocket-sized "Executive Guide to Computer Security," now available from the National Bureau of Standards (NBS), gives a thumbnail sketch on what a company president can do about security in his own company.

The 16-page pamphlet, prepared jointly by the NBS Institute for Computer Sciences and Technology and the Association for Computing Machinery, tells why security is important, where the most serious threats lie and what the available solutions are.

The pamphlet is available free of charge from the Institute of Computer Science, NBS, Washington, D.C. 20234.

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Teachers, Managers Agree on DP Course Requisites

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. – DP managers and computer faculty members at universities within Indiana are in basic agreement on the type of courses needed to educate DP managers, systems analysts, programmers and computer operators, according to a recent study.

The study was conducted to determine what degree of DP understanding is required by the two groups for each of the DP career personnel categories. A questionnaire was sent to 77 faculty members and 231 DP managers within the state, according to John T. Gorgone from Purdue University who conducted the research. The results were presented at the recent Association for Computing Machinery (ACM) Computer Science Conference.

Each respondent was asked to evaluate how important specific types of training were to prepare a DP student for the four positions studied. These ranged from no exposure needed to a thorough understanding of the subject.

Results of Study

For DP managers, both faculty and managers agreed a workable knowledge was required in the areas of data communications, general programming techniques and systems analysis. A working knowledge of documentation procedures was needed, the study showed.

A basic knowledge or very limited working knowledge of sort/merge techniques in both tape and disk, computer storage and retrieval techniques and programming languages was cited, and also a basic understanding of disk operating systems and simulation techniques.

For the systems analyst, the study showed there was "total agreement" academic preparation should include systems analysis, documentation procedures, general programming and computer storage and retrieval techniques. A workable knowledge was required of computer sort/merge techniques, both tape and disk; some data communications experience; disk operating system familiarity; general programming techniques, with knowledge of some specific languages; and simulation and decision models. A very thorough knowledge of documentation procedures was cited in the study.

Programmers' Knowledge

For programmers, there was agreement a thorough knowledge was required in storage and retrieval techniques, documentation procedures, general programming and specific languages. The study also called for a workable knowledge in sort/merge techniques, data communications, disk operating systems and systems analysis. A basic understanding was required in simulation decision models.

To become computer operators, the faculty and management respondents said a workable knowledge of disk operating systems was necessary. A basic understanding was required of sort/merge techniques, storage and retrieval techniques, data communications, and documentation procedures. A basic understanding of general programming and some exposure to specific languages and systems analysis was also needed.

Purpose of Study

The study was conducted to gather information that would be applied to a two-year programmer curriculum and a four-year program for systems analysts and DP managers, Gorgone said.

There was general agreement between faculty and industry representatives on what students should be required to know, he said. This apparently means faculty members know what is required, but there may be difficulty in getting the subjects implemented into the curriculums, he added. All faculty members polled in the study were either in computer science, business DP or computer technology teaching positions.

CW Photo by H. Frank

John T. Gorgone

System/7 Approved By Lloyd's Register

LONDON – The control engineering department of Lloyd's Register of Shipping has approved the IBM System/7 Maritime Applications/Bridge System for use on vessels listed with Lloyd's Register.

This marks the first time a navigational aid has been included on Lloyd's "List of Type Approved Control and Electrical Equipment," the insurance firm said.

The system is said to assist ship officers by reducing the amount of data to be correlated and by improving the presentation of that information over earlier systems.

Signals from the ship's radar, speed log and gyrocompass can be fed into the system and interpreted to determine where collision risks exist and how much of a threat they represent.

In addition, the results of navigational decisions can be forecasted.

Improves Operational Efficiency

The Bridge System is designed to improve operational efficiency through route calculation and position fixing in conjunction with an autopilot.

The equipment can be connected to several aids such as satellite navigation receiver, Decca Navigator, gyrocompass and speed log, and the ship's position is plotted continuously.

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Editorials

Putting the Pot on the Fire

There finally seems to be an opening date for the start of the main event – the suit against IBM by the Justice Department [CW, March 12].

The excuses about lack of staff and document problems, and all the rest put forward by the Justice Department, appear to be wearing a little thin on Judge Edelstein. And well they might.

This suit has been smoldering on the back burner for years. It has thus far been an exercise in legal procrastination while an anxious industry waits for someone to put the pot on the fire.

The stakes in this suit have been hashed and rehashed many times over. The judge put things in perspective when he said each day that goes by allows IBM to perpetuate its alleged predatory practices – "if IBM is a violator."

There is a tendency within the U.S. legal system for the public to become a victim of its own built-in safeguards. Perhaps, as the lawyers for both sides have warned, they will reach an impasse after the trial gets underway. That would be a proper time to seek a postponement – but not now, not when an industry has already waited too many long years for an answer on whether IBM is a monopoly.

New View of the DP Center

As the recession engulfs many U.S. businesses, the efficiencies of data processing are increasing in importance. The typical company is going ahead with plans to expand or further optimize its DP capabiliites. Recent estimates by International Data Corp. show purchases of DP equipment are now expected to be 14% ahead of 1974.

This information will come as no surprise to the DP manager who has had an uphill fight convincing his management of the indispensible power of the computer. But it does indicate an increased awareness on the part of management that an effectively operating DP center can hold one key to profit or loss in a tight economy.

The increasing importance of DP within each company also carries with it an obligation on the part of users and vendors. Both will have to regard the DP center as a profit center that can be held accountable for its results, much like a manufacturing division.

Along with this concept goes a responsibility for vendors to optimize performance and avoid the impulse to oversell equipment that is much greater than the customer needs.

For DP staff members, it means more effective coding of programs, less wasteful procedures and a more smoothly functioning DP center.

These may sound like idealistic goals for everyone concerned. But when the specter of economic recession is gone, it may turn out the DP center was directly responsible for fostering a corporate upturn.

'. . . And Then Colby Told Those Congressmen Demanding a Name Count That They'd Jolly Well Wait for the Next Census, Like We Do!'

Letters to the Editor

Blame Poor Design, Not Media For Costly, Ineffective Training

I take exception to T.R. Young's statement, "I have yet to meet a media trainer who has measured the effectiveness of his training" ["Oil Company Becomes Vendor of DP Training Courses," CW, March 5]. There are a number of problems with this statement.

Measuring training effectiveness has nothing to do with the media used. Training is either effective or it is not. The ability to measure training effectiveness must be designed into the course from the beginning and is not dependent upon the choice of media, but rather on the ability of the course designer to follow proven instructional design and development procedures – i.e., measurable, behavioral objectives, task analysis, etc.

The term "media trainer" may be extremely misleading. If Young was referring to media specialists, his statement is probably correct. However, media specialists are not educators and tend to favor wide use of media even when it is not educationally effective or cost-effective. Putting educational design and development in the hands of media specialists will almost always prove costly and ineffective.

I suggest Young make an attempt to meet more trainers. For example, there is a group within Control Data Corp. that is probably the most capable and experienced group of educators gathered in one place for industrial training purposes. These people have been able to develop a wide range of courseware.

Any courseware that is well designed can be measured for effectiveness. Young's statement should not be taken as an indictment of media, but rather an indictment of poor instructional design and development.

Joseph A. Komar
President

Komar and Associates
Burnsville, Minn.

Weighing the Trade-Offs

Having read the recent surge of letters and articles on Assembly vs. high level languages, I note no one has expressed the relationships involved.

Being a programmer of noted proficiency in Assembly, Fortran, Algol and several others (I avoid Cobol), I feel there are certain trade-offs to using higher level languages.

An average program is coded equally as fast in Fortran as Assembly. This is due to the complexity of the CRT screen addressing techniques needed for Fortran and the ease of this in Assembly. Also, the Assembly version uses less core and runs with less machine time.

Alternately, a calculate program – one which reads a file, calculates and rewrites a file or prints a report – would be much faster to write in Fortran.

There is no pat solution to this problem except to regard the complexity of the task, the I/O involved, the running efficiency necessary and personnel available to decide which language would be more efficient.

Matthew L. Goldworm
Miami, Fla.

Defense of Nested IFs Weak

I don't write Cobol programs, nor do I exactly understand all the nuances of structured programming and its accompanying debate, but what I don't understand most of all is Robert A. Wonderly's letter in the Feb. 26 issue.

If nested IFs are as confusing to decipher as Wonderly's sentences, and if, as he said, "Nested IF logic is inherent in the way man's mind reasons," I must be a sad Neanderthal indeed!

On the other hand, if a major goal of structured programming is to improve readability, Wonderly's letter speaks well in its behalf – and perhaps not so nobly in defense of nested IFs.

Alan P. Schlutsmeyer
Pasadena, Calif.

Cobol Overdue for a Cleanup

I agree with Robert A. Wonderly's call for an END statement in Cobol [CW, Feb. 26] – I have felt the lack of it for several years.

In keeping with the Cobol goal of English-like readability, I call this the ANYWAY statement:

```
IF A > 0 THEN
IF A < 5 THEN
  PERFORM TALLY-LOW-QUANTITY
ANYWAY
  SUBTRACT QTY FROM A
ELSE
...
```

It would seem a Cobol precompiler with only modest syntax-level capabilities could implement the ANYWAY statement by generating the duplicate (oh horrors!) code that is now handwritten:

```
IF condition THEN
  statement-group-1
ELSE
  statement-group-2
ANYWAY
  statement-group-3
```

becomes

```
IF condition THEN
  statement-group-1
  statement-group-3
ELSE
  statement-group-2
  statement-group-3
```

The expansion would proceed backwards through a sentence, with obvious resolution of little problems like "NEXT SENTENCE" and "no ELSE clause" (="ELSE NEXT SENTENCE").

The point is that Cobol is overdue for a rounding-out and cleanup of the flow-of-control verbs and conditionals in order to eliminate the current esoteric limitations.

Robert Higgins
Newark, Del.

'Cast Aside Cocoon of Isolation'

To Become Professionals, DPers Must Communicate

By Lewis L. Copley Jr.
Special to Computerworld

I recall a prediction made not too many years ago. This prediction indicated members of the DP community could expect many of their fellows to rise through congested middle-management ranks to surface as key corporate figures.

With few exceptions, this prediction has not been realized. I think it would be timely, in light of the current clamor for professional recognition, for those of us in the DP community to remove our glasses, wipe clean our eyes and determine why this prediction has not been realized.

It is unfortunate, but equally obvious, the fault can be attributed to ourselves and not to the prediction.

When the concepts of DP were just beginning to emerge, it was a relatively simple matter for those people connected with the DP effort to communicate with the organizational areas being affected.

The chances were that the newly created manager of DP had previous line management experience. This individual was knowledgeable about the corporate direction and proposed objectives.

Communications Viable

The communications between this new manager and the line user were viable; they both spoke the same language. The user could understand and appreciate how the number of clerical tasks performed in a manual filing system could be reduced by recording the information in card image format and utilizing the then-new electronic accounting machines.

The user's inherent "resistance to change," while present, was minimized because he was a part of the total effort. The user area's apprehensions were dispelled; the changes implemented were accepted and in many cases welcomed.

With the advent of more and more sophisticated hardware and software, this free flow of communication between the user and DP areas began to dry up. Those individuals in the DP effort began to isolate themselves.

A seemingly incredible amount of information was being presented to the new DP staff. Suddenly, we were caught up in the fever generated by the new "miracle of technology," the computer.

We became intrigued with the newer and faster hardware; we lost ourselves in the pursuit of technical information, operating systems and software techniques; our conversations were proliferated by acronyms and technical jargon.

In retrospect, this evolution was natural. It was born of the necessity to assimilate, digest and retain an ever-increasing wealth of information.

With the introduction of multiprogramming and multiprocessing, this necessity was compounded. We laced a cocoon about ourselves and parsimoniously educated the master we served – the user. The effects of this isolation from the user were nearly ruinous.

'Resistance to Change'

By failing to educate the user in our methodology, we allowed his apprehensions and ignorance to foster a stiffer "resistance to change." The disparities in our communications with each other led us to assume the user was ignorant and caused the user to label us "technocrats" or "elitists."

Our own preoccupation with bits, bytes and software considerations, coupled with the user's inability to define his needs in terms we could readily understand, resulted in the development of unwieldy computer systems. Maintenance of these systems was a burden for the DP staff; utilization of the system was a burden for the user staff. The user's trust and confidence in our ability to deliver an acceptable product was shaken.

In our effort to master new technology, we apparently lost sight of our reason for existence. We were no longer adjunct to the mainstream of our organization's direction; we were no longer cognizant of its objectives.

Progress Being Made

Fortunately, progress is being made in solving these problems. But, they have not been solved yet.

When user confidence and trust is reestablished in our ability to provide an acceptable finished product, then perhaps our cries for the accordance of professional status will be justified.

Then, too, the areas of certification and licensing legislation may be gingerly pursued.

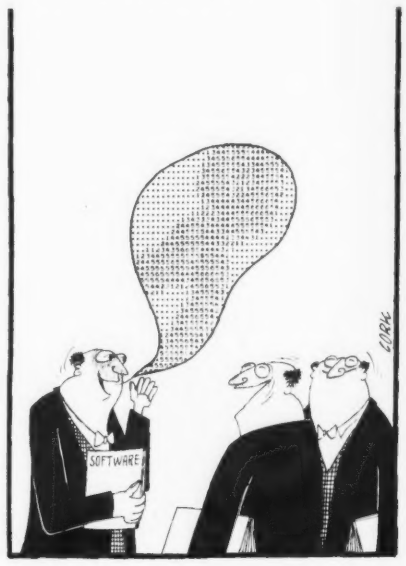
Until that time, however, attempts to entrench ourselves as professionals will be viewed by many as another bitter pill to be swallowed.

The real challenge facing members in DP management today is not to continue the pursuit of technical expertise. It is, rather, to accept the challenge implied by that prediction made not too many years ago. The commitment to learning the business and direction of our organization must be just as concerted as the commitment was to garnering DP knowledge. It is up to us to become the user. It is up to us to cast aside the cocoon of isolation.

Along the way, we may experience a metamorphosis, from DP professional to senior executive.

Copley is a programmer/analyst with the Prudential Insurance Company of America in Roseland, N.J.

Reader Commentary



In Gentle Art of Courting Vendors

Opening Negotiations Easy When Right Steps Known

Computer negotiations have never been easy – unless one considers it easy to sign on the dotted line because there is no other choice. It may be easy at the time, but there are a number of associated problems, including the lack of support definition, details on the expected performance of software and hardware, questions of scheduling and compatibility and so forth.

The Taylor Report
By Alan Taylor, CDP

Nowadays, an increasing number of people want to negotiate contracts, instead of simply signing them. Their problem is how to get through the vendor's armor-plated objections to any negotiations on a formal basis.

The vendor often uses a three-level defense line:

- It is essential to have mutual trust and asking for things in writing shows a lack of trust.
- The vendor will promise the user anything, but can't put it in writing because of government contracts.
- The vendor must be fair to his other customers and, therefore, can't promise the user special treatment.

Experience has shown none of these defenses are really watertight against a computer user who knows what he wants. Even the most straitlaced vendors have been known to move from their "official" contracts on occasions. But, a sort of formal "courtship dance" between the user who knows how to negotiate and the vendor who wants to keep the business from some competitor has to take place. The user must know his steps in the dance.

The first step is easy. The "lack-of-trust" routine can cut both ways. The user should point out that a careful man (and he hopes the vendor is always careful) takes precautions to ensure everyone understands his own role and responsibilities.

It is not a matter of not trusting the vendor, but of wanting to make certain the vendor is properly careful. It's his carefulness that makes it appropriate to have matters in writing.

As the vendor certainly knows better what he intends to provide than the user does, it is better that he, not the user, puts it in writing, although the user would do that if requested.

This gambit, which is aimed at either getting the vendor's promises in his own writing or getting him to request that the user place them in writing, has many variations. One that is sometimes used, however, can be disastrous unless the user's organization is unusually prepared. This is the kicking-it-upstairs approach.

Kicking it upstairs seems to work out very well at first. In it, the user responds to the lack-of-trust accusation by saying the DP operation, of course, trusts the vendor, but some of the old, ignorant bosses upstairs are untrusting.

However, this allows the vendor to evade putting anything in writing simply by successfully persuading some people in management it is not needed. Effectively, it splits the user team into two competing halves. Successful negotiations rarely occur once the vendor has been given the kicking-it-upstairs opening.

Once over the first hurdle, the next line of defense is often the major contract between the vendor and the government, which is negotiated through the General Services Administration (GSA). It contains a set of conditions, prices and other matters which some of the government agencies use.

The vendor's use for this document in nongovernment negotiations is to claim anything not in the GSA contract can't formally be given to any user, because the government would demand rebates or additional values.

There is some truth in this, in some cases. GSA contracts often do require that the government get the advantage of any change in price. But only in price – not in any other changes of conditions.

The user's response to the GSA gambit is to point out he is not seeking a price decrease (unless he is – then, see the next gambit) and, therefore, the GSA contract isn't involved. If the vendor persists, ask for a copy of the contract.

This whole GSA gambit is used primarily as a face-saving device for the user when the vendor is not ready to negotiate, but wants to allow the user to claim he really tried to negotiate. Insistence upon the GSA contract rejection is a sign the vendor doesn't really care about the user's business and is a warning to the user to look elsewhere for his computer.

'Most-Favored' Clauses

If a user gets through the first two hurdles, it is clear both sides are serious about being prepared to negotiate. However, there is still one last hurdle before work can really begin. This is the "fair-to-our customers" gambit, also known as the "most-favored-nation clause."

In this, the vendor cloaks his refusal to negotiate under the admission that some other users have received special consideration. These other users have received contracts which give them any benefits or allowances the vendor gives to any other user. Therefore, the vendor's argument runs, the items can be provided only on an informal, unwritten basis.

The specious part of the fair-to-others argument is that it assumes the user's installation is in exactly the same position as the other installations which have received these agreements.

The user knows this isn't true, of course. His particular installation is unique and has problems and possibilities which no other installation has. If this fact is recognized, there is no requirement to extend the benefits it obtains to others. Now the question is how to get this recognized.

Here, for the first time, the user must do something for himself. He must come up with some reason why:

- His installation is unique.
- This uniqueness ties into the benefits to be negotiated.

Put this way, it doesn't take long to find an appropriate response. The installation may be unique in being the first one in town or the first one in the industry or just by being the first one on the block. There must be something that makes it unique, even if it is the way the operators are dressed.

Then, because of this uniqueness, it can be expected other people will come and look at this wonderful, successful installation and stay to buy computers from the vendor. This gives the vendor a reason he can negotiate with this user and overcomes the last of the three defenses against opening negotiations.

The courtship dance is over, and it's time to get down to serious work.

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Standards Stamp Out 'Obscenity' in Documentation

Reader Commentary

By Gopal K. Kapur
Special to Computerworld

The *American College Dictionary* defines the word "obscene" as offensive, abominable, disgusting. Have you ever come across a program that struck you as being offensive, abominable and disgusting?

I have. Here are some examples of code from one such program:

```
IF Y1BI
   EQUAL TO DAAJ OR
   Y1BI EQUAL TO DDAJ
   OR Y1BI EQUAL TO CDAJ
   OR Y1BI EQUAL TO AADJ
GO TO FE.
MOVE 20XX0039 to 00AI00KC
MOVE 20XX0049 to 00AFAEKC.
ADD 2000YY49 OOAJALRT GIVING 180YY07.
```

This, to me, is an obscene program.

About six months ago, I was asked by the DP director of a moderately large company to review and evaluate a financial system (a set of 14 programs) that had been developed at great cost and with high hopes.

Since its implementation, the system had performed very poorly and the DP department was months behind in providing changes and modification support. The users were very angry and were threatening to go back to their manual system.

The DP manager could not offer any clear-cut explanation for the problems and was quite upset over the user department's complaints and accusations. The maintenance programmers complained bitterly that programs were very poorly written, no documentation was to be found anywhere and data and procedure names were so absurd and illogical it took them days to make even simple changes.

With the advent of Cobol, the "English" language, it was hoped programs would become readable and self-documenting. However, this has not been the case.

The guidelines, concepts and methods for developing application program documentation have usually been left to the individual programmer and, as a result, this has become the "Achilles' heel" of a DP system.

Poorly documented programs may not have immediate adverse effects on software performance as long as the originating programmer is around to sort out the problems. The trouble arises when modification is necessary and the originating programmer is no longer available or has forgotten the details.

In most computer shops, there is absolutely no conformity and no consistency in the way programs are written. For all practical purposes, they might as well be written in Sanskrit. Imagine what it costs in terms of delayed target dates, erroneous output and excessive maintenance.

Too often, programs are written with a single thought in mind: Getting them to run. Almost the entire effort is directed toward finishing the job with little or no attention to standards and documentation. This results in a perpetual "change/modification mess" all too familiar to the DP managers.

DP Training a Factor

One of the major underlying reasons for such a dismal state is the manner in which most programmers are trained. Most programmers learn their programming skills through very condensed courses where the main emphasis is placed on "pure coding."

During such courses, little, if any, emphasis is placed on the language structure, proper language usage, data representation, program organization and structure and documentation methodology.

To prevent such messes, a well-organized, well-written standards manual is a must. Office memos and word-of-mouth communications aren't effective.

Standards should be easy to understand and easy to locate. They should be concise and to the point, and they should include actual examples of standard practices. A standards manual should have a complete index; otherwise, it is almost useless.

A standards manual should include the following subjects:

- Language standards.
- Coding standards and guidelines.
- Design standards and guidelines.
- Documentation standards and guidelines.
- Efficiency considerations.

Some resistance from the programming staff toward the standards should be expected and is natural. Old habits don't die fast. Especially the bad old habits. Therefore, training and briefing in new standards is essential.

The person responsible for designing the standards should hold meetings with the programming staff, discussing the need for the proposed standards, the considerations that went into designing the standards and the importance of each programmer's full cooperation. All of the programming staff will not agree with all standards, and, frequently, disagreements will be based on good ideas. It is necessary that such points be considered and properly evaluated.

Quality Control

It is not enough to have designed and distributed a standards manual. The DP department should have diligent quality control and enforcement procedures; otherwise, it is better to have no standards at all.

There will be violations of the standards by the programmers, either by accident or by design. Therefore, it is necessary that work of all programmers be monitored to assure adherence to the established standards.

A well-designed standards manual becomes very beneficial when programming work is contracted out.

Don't allow the standards manual to stagnate; if you do, it will soon be useless. Innovations and experience demand reconsideration of old procedures. It is most important to eliminate those standards and guidelines which have not produced any valuable results.

The most essential requirement of any standards program is management support. Without full commitment of corporate and DP management, any standards effort will yield minimal benefits. It is the task of the DP manager to take positive initiative in this direction.

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IBM Seems Sympathetic, But...

Flaws in DOS/VS Release 30 Plaguing Some Centers

By Don Leavitt
Of the CW Staff

User experience with IBM'S DOS/VS varies widely – especially with Release 30 – but several of the installations recently contacted by *Computerworld* have become almost philosophical about their problems.

One said a friend of his was told by an IBMer to "forget Release 30, stick with 29 and wait till Release 31 comes out," which, according to most estimates, should be ready this month or next.

Windes McClaughry & Co., a certified public accounting firm in Long Beach, Calif., didn't wait for Release 31. The company moved up to a 370/115 from a 360/22 with every expectation the new system would be faster.

Benchmarks made before the changeover indicated that, in a real environment, the 115 would outprocess the 22, according to user spokesman Kurt Alderson.

But then things happened – or, rather, didn't happen. "IBM said Power [a spooling package] would provide a 30% increase in throughput. But it never did fly," Alderson said, "probably because we brought a 2540 multifunction card machine over from the 22 and Power wasn't programmed to support that device." Windes McClaughry went to Sprint (from Jason Systems) "and that works fine," he added.

IBM's program product MPCS, "some sort of variation on CICS," was considered for on-line work the company was just getting into, but when the user discovered IBM was withdrawing support for the product as of December, 1974, it withdrew from any further ideas about that. The teleprocessing monitor Swift, from GBA International, was chosen instead.

But even with apparently good software in place, "the machine falls down on its knees whenever it's got two or three partitions up and running," Alderson said. With teleprocessing in F1, the spooler in F2 and batch work in background, it can "just barely process the TP."

Actual timings show 18-second response times rather than the five seconds seen in simulated runs before installation, he said.

Windes McClaughry is having IBM apply "every PTF they've ever had for our system" that might have any bearing on Btam or any other part of the VS environment. But the user is also following the route forecast by many observers: buying more equipment.

American Express Investment Management in San Francisco, also got PTFs from IBM to try and cure its problems with DOS/VS on a 135. "But IBM sent us the wtong tape. We got the PTFs for Release 29, so we sent them back explaining they weren't exactly what we were after," assistant DP manager Robert Sloan said with a slight chuckle.

His situation is, in fact, far from comical. His installation has suffered from "hard waits" when the system tries to access "FFFs" in low core and the machine "says it can't do anything because of invalid code."

Sloan has sent dumps to IBM to try and identify the problem, but thus far he is still waiting for an answer.

"Soft waits" also occur, he added, but these are easier to clear even if inexplicable: "We run a blank card through the card reader and everyting starts up again."

Custom Program Work Supported By Association, Contract Guide

Two recent but completely separate events suggest custom programming is still very much a part of the current scene.

The Independent Computer Professionals Association (ICPA) was established late last year to provide an exchange service that would help client organizations find competent programming services and independent DP professionals develop new customers.

Based in San Jose, Calif., ICPA has about 200 programmers on file and is adding "about 30 to 50 per week," according to Charles E. Humphrey, president of the organization.

ICPA "has set up a method to service a nationwide network of clients with our programmer's *Bulletin*, which is circulated to subscribing independent computer professionals twice each month," Humphrey said.

The organization also provides a training program to help programmers market their skills in the contract programming environment, he added.

Courses from ICPA currently include recordkeeping, the art of bidding and sales awareness, according to Humphrey. He noted the organization charges a 15% fee, based on the amount the independent programmer receives after completion of the contract; it was not clear, however, whether the client company or the programmer is expected to pay the fee.

ICPA is based at Suite 703, 3032 Tisch Way, San Jose, Calif. 95128.

Meanwhile, Educom – the Interuniversity Communications Council, Inc. – has published for general distribution Volume II of *Contracting for Computing* which is, as the subtitle states, "a checklist of terms and clauses for use in contracting with vendors for software packages and custom software."

Though many of the general warnings in the book's narrative have been said many times before and Educom tried to aim it particularly at colleges and universities, the 148-page publication is made up largely of clauses, phrases and paragraphs for actual contracts – and explanatory text – that appear to be appropriate for any organization considering packages or custom software.

Copies of the book are available for $15 for nonmembers and $7.50 for members from Educom, P.O. Box 364, Princeton, N.J. 08540.

Fortran Supports Basic

ATHENS, Ga. – Users of virtually any medium- to large-scale computer system that has Fortran capabilities can have Basic facilities as well with the University of Washington Basic Interpretive Compiler (UWBIC) now available from the Cosmic clearinghouse.

UWBIC consists of a set of eight subroutines written entirely in Fortran IV. The program accepts as input programs written in Basic and data to be operated upon by such programs.

The output produced by UWBIC will be either diagnostic messages indicating errors in the Basic coding or the output produced by following the instructions written in Basic with the data provided, Cosmic said.

UWBIC operates in two phases. The compilation subroutines accept the Basic statements, check their syntax, issue diagnostic messages if required or prepare equivalent instructions in a pseudomachine language, a clearinghouse spokesman explained.

If the compilation is successful, control is transferred to the routines that make up UWBIC"s execution phase. These simulate a computer with the instruction set defined by the pseudomachine language and they execute the program directly, without extensive retranslation.

UWBIC thus lies between true compiler systems and true interpretive systems.

Made up of "approximately 3,307" cards, UWBIC is cataloged by the clearinghouse as COS-01960 and can be purchased for $450. As with most Cosmic software, documentation is available separately for $8.

Cosmic is at 112 Barrow Hall, University of Georgia, here in Athens, 30602.

ADR Enhances 'The Librarian'

PRINCETON, N.J. – Version 5.0 of The Librarian source-program library management and control system from Applied Data Research, Inc. (ADR) includes several features to simplify its use and provide the user with better controls.

At the same time, an interface to the Cross-Program Auditor (CPA) option, originally developed for ADR's Autoflow II package, has been developed to extend The Librarian's monitoring capabilities to multiple programs.

Within Librarian 5.0, the Group Processing Option (GPO) permits processing functions that had been available to individually selected modules in a master file to be applied to predefined groups of modules or to an entire master file.

Modules can be grouped together by naming convention or "any combination of module attributes," and the grouping is done by a user-provided control card, ADR said.

Once grouped, modules can be copied, deleted or selected for updating, global editing, compiling, printing or punching. Use of GPO facilities can be restricted to designated files, modules or personnel.

With Version 5.0, the Librarian index listing can now be produced in a single-line format showing essential module attributes or a two-line format showing all attributes of a chosen group of modules.

A Fast Copy feature permits the user to produce a duplicate disk master file (e.g., to expand its allocation or alter the blocking factor) directly, without creating a backup tape.

The CPA option is a system-oriented tool to examine user-specified groups of modules in a Librarian master file and is designed to specifically extract information common to any number of input programs.

The basic Librarian package runs in 26K to 35K bytes under DOS or 60K under OS. It will also run in VS environments.

The OS version of The Librarian is available for $5,800, while DOS users can acquire the package for $4,900. The CPA option costs an additional $3,300 (for OS) or $2,750 (for DOS), the company noted from Route 206 Center, 08540.

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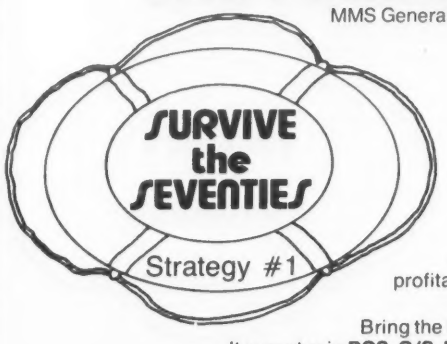

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Software Engineering Concepts Work, Compcon Told

By Molly Upton
Of the CW Staff

SAN FRANCISCO – More programming should be done by computer, according to Robert Balzer. Defining software engineering as an "attempt to do the wrong job better," he added "the real problem with programming is people."

Participating in a session on software engineering at the recent IEEE Computer Society's Compcon/75 meeting, the project leader at the University of Southern California's Information Science Institute said, in his view, "it's incredible that we who work to automate everything else are not working to automate our own job."

Neither Balzer nor any of the other panelists could present a completely acceptable definition of "software engineering," but they seemed willing to agree a software engineer is one who knows how to tackle a problem, define it and approach it in a logical manner.

Michael Galey of IBM's Information Systems Department pleaded for better management of software projects, citing the need for three control dates: planned, target and commit. He said those in charge of a project should not simply commit to a delivery date without also committing to dates during various development stages.

"We promise the world – until the day we don't deliver," he said, summing up today's prevalent approach to projects.

After dates are set, Galey added, clear specifications are most important in program construction. But many installations fail on this point.

His crew, on the other hand, have had good results by "making specification writing and development of objectives a worthwhile effort."

The original specifications are used to "walk through" the proposed procedures before any coding is started. They are also used in run manuals and as documentation for an independent test group. This has been very successful and lent credence to the importance of documentation, he said.

Harry Court of Systems Development Corp. spoke up for more of a top-down approach to program development as one way of moving toward software engineering. The lack of standardized methodology has led to the common problem of "reinventing the wheel" and to an inability to evaluate the effect of new techniques, he said.

An inability to effectively assess personnel capabilities and to select the more effective workers also hinders progress in the field of software engineering, he added.

Robert Gaines of the Rand Corp., another panelist, argued the lack of debugging tools indicates the current state of software engineering. "We can judge when a technical field reaches maturity by the time at which it starts investing in the tools it needs to perform its defined functions," he said.

Echoing thoughts expressed in an earlier Compcon session, Balzer thought code optimization should be the last step in program development. "We need technology to introduce optimization gradually into unoptimized programs," he said.

"We've gotten rid of the GO TO [at least in theory]; now let's get rid of the variable," he urged.

Despite the session's clear endorsement of engineering approaches, one member of the audience doubted they would penetrate the real world: "It's difficult to expect corporate management to know what it wants or to clearly define projects, since it is often accustomed to managing its business in an ad hoc fashion."

System on Nova Helps Builders

ENGLEWOOD, Colo. – Construction companies with substantial projects but no DP expertise can handle their cost accounting on a 24K word Data General Nova or Eclipse minicomputer by utilizing the Construction Mini-Miz system from Automated Quill, Inc. (AQI).

The system operates conversationally with CRT input or batch input and control from any input device. The software provides processing for payroll, accounts payable, accounts receivable, general ledger and job costing, AQI said.

Program logic is built around a single input transaction feeding all related application areas, avoiding the duplication of effort – and potential for error – that requiring separate input for each area would entail.

The complexities of payroll classifications, deductions, union dues handling and labor distribution and project costing all are built into the system, the vendor said. Payroll checks, payroll registers and union reports are generated by Construction Mini-Miz, an AQI spokesman added.

The system produces labor allocations, job cost reports and accounts payable checks and registers, as well as accounts receivable reports, general ledger documentation, income statements and balance sheets.

Designed for use under Data General's RDOS environment, the software system – in Fortran IV – is available for immediate delivery at a price of $8,400.

AQI is at Suite 5, 3501 S. Corona St., 80110.

ICS 75 Set

PARIS – Eleven technical sessions, during which about 40 presentations will be made, are included in the final agenda of the International Computing Symposium (ICS 75) to be held at the Palais des Congres in Juan-Les-Pins-Antibes on the French Riviera in early June.

Main topics to be covered, according to ICS 75 sources, include numerical analysis, programming languages, theoretical computer science, computer system models and performance measurement, terminal systems and system design. The program will run from June 2 to June 4, they added.

ICS 75 is the fourth in a series of symposia organized by the European chapters of the Association for Computing Machinery (ACM).

This year's sessions mark the first time the symposium is cosponsored by the European Cooperation in Informatics (ECI) which has been formed by Afcet (France), Aica (Italy), BCS (United Kingdom), GI and NTG (Germany) and NRMG (Netherlands).

More information about ICS 75, which is being organized by the French chapters of ACM and Afcet, is available from Afcet at 156 Blvd. Pereire, 75017, here in Paris.

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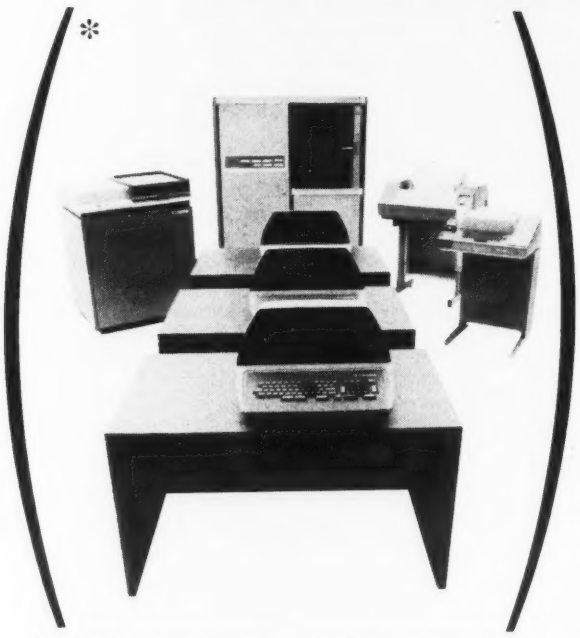

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Clear Thinking Vital

Nested IFs Not 'Evil Plot' Leading to Program Bugs

By Edward Yourdon
Special to Computerworld

During the past year, a number of articles dealing with nested IF statements have been published in *Computerworld*. Most of these articles were prompted by the relatively recent interest in structured programming, the theory first published in 1966 by Bohm and Jacopini which states any program can be constructed from combinations of elementary statements, IF-THEN-ELSE statements and DO-WHILE statements.

Concepts and Techniques

Since structured programming has taken on a religious aura of "goodness," it follows that IF-THEN-ELSE statements and – more important – *nested* IF-THEN-ELSE statements are also considered "good." On the other hand, most programmers have been told for years that nested IF statements are "bad."

This sudden switch has caused a great deal of uneasiness, and a fair amount of controversy; hence the recent articles in CW and hence the numerous, often emotional letters to the editor agreeing or disagreeing with those articles.

To some extent, the controversy is rather puzzling. The basic concept of IF-THEN-ELSE is an inherently simple idea that should appeal to us as programmers (since much of our programming involves binary decisions, binary numbers and binary thinking) and as human beings (since we are accustomed to dealing with either-or situations from childhood). The concepts of nested IF-THEN-ELSE structures is equally simple in theory.

It seems most of the complaints really have very little to do with the theoretical structure of nested IFs, but rather with the practical aspects; it is very unpleasant looking at all of the detailed logic represented by 13 levels of nested IF-THEN-ELSE statements . . . especially if a programmer was never taught how to use nested IFs.

The fact that so many programmers continue to debate this issue is an indication they are relatively unaware of the concept of top-down design, which suggests we express the major (or high-level) logic of a program in about one page of code. This is done by having the high-level logic invoke subfunctions, which in turn can be implemented in one page of code by invoking even lower level functions.

One Problem

One of the problems with this approach is most programmers have not been trained to recognize functions; in their attempt to avoid deeply nested IF statements, they will invent a module that, for example, only carries out half of a function. This concern with functional modules is part of a body of theory known as structured design and is best summarized at the current time in an article by Constantine, Myers and Stevens in the May 1974 issue of the *IBM Systems Journal*.

Despite these theoretical arguments, a number of programmers – especially Cobol programmers – continue to suggest nested IF statements are an evil plot to introduce bugs into their programs and should be banished immediately. There are several reasons for this, many of them interrelated:

- The syntax of the Cobol language makes it difficult to form certain kinds of nested IF structures.
- Most Cobol manuals describe nested IFs in a fashion that would confuse Einstein himself, not to mention ordinary programmers. A number of recent CW articles have commented upon this, and virtually everyone who has ever read a Cobol manual will agree.
- There is a great confusion in many Cobol manuals between nested IFs and compound conditionals; one will occasionally hear arguments that nested IFs should be avoided because of difficulties with statements like

```
IF A NOT EQUAL B OR C PERFORM
GLOP.
```

Compound conditionals can indeed be a problem and deserve to be discussed. However, they should not have anything to do with nested IFs – and they should not be discussed in the same section of the Cobol manual, which they usually are.

- There is a great deal of propaganda concerning nested IFs, especially from programming instructors who had trouble making them work when *they* were programmers! One almost expects to hear arguments that programmers who used nested IFs have more cavities than those who do not.
- At one point, many Cobol compilers had bugs that led to incorrect object code for nested IFs or highly inefficient object code.

This area was very important several years ago, but it is generally irrelevant today. Unfortunately, many programming standards manuals are based on circa 1968 programming technology.

- Most commercial programmers have never been exposed to any formal training in Boolean arithemtic (which is why they have such trouble dealing with compound conditionals), or truth tables, or finite state automata, or – to use the more familiar programming term – decision tables.

I would like to make two comments about decision tables. First, if a logic problem (e.g., an editing application) is expressed first in a decision table form, most of the logic errors can be removed (instead of waiting until the code has been written), and the coding – i.e., the writing of nested IFs – is a truly trivial activity.

All of the arguments about maintaining nested IF statements disappear when viewed in this light: *first* change the decision table, and that will show you how to change the code.

Second, the chances of writing optimal code when one begins with flowcharts or nested IFs are very small; if one is interested in optimization, it makes much more sense to express the logic in a decision table form first and then use any of a number of optimization algorithms (such as the ones published by Reinwald and Soland in the July 1966 and October 1967 *Journal of the ACM*) to generate efficient code.

Yourdon is president of Yourdon, Inc., in New York City.

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COMMUNICATIONS

Bell Pricing—Part 2

Automatic Rate Adjustments Will Affect Users' Bills

By Ronald A. Frank
Of the CW Staff

How close are automatic rate adjustments in monthly phone bills? The best answer is that no one is sure, but the concept seems to be feasible.

The greatest evidence of a trend toward automatic phone rate changes appears to be in intrastate service. Recently the New Jersey Supreme Court upheld an "automatic rate increase" which took effect without a full hearing procedure before the state's Public Utilities Commission.

To justify this rate hike, New Jersey Bell cited "uncontrolled costs" in the areas of wages, income tax and depreciation costs. And it has said it plans annual automatic adjustments of customer bills without full hearings.

A similar proposal for rate adjustments is pending in Illinois, where Bell has said it would make monthly adjustments in phone bills based on a cost and efficiency formula.

It seems obvious the Bell System will try to expand the automatic rate adjustment principal to other phone companies for intrastate services.

Could this trend spread to interstate phone service controlled by the Federal Communications Commission (FCC)? Most regulatory experts agree it might be applied from a conceptual standpoint, but those currently administering FCC regulations would not look favorably on such a change.

One industry source close to the FCC said "the consumer is entitled to know what his charges are based on. I don't think the commission would tolerate anything like that."

From a legal standpoint, both the Communications Act and FCC regulations apparently require charges for phone service be published in advance of any rate changes. Under current FCC procedures, any parties that object to rate changes have an opportunity to respond to these proposals and enter their objections before a decision is made.

Under automatic rate change procedures, the notice of rate change would be published and the rate would take effect without users having a chance to respond. Such a system would be based on the premise that Bell (or any other phone company) is entitled to a specific rate of return over its fixed costs.

If the telephone company could show higher costs had cut this rate of return, then it would have the right to adjust rates accordingly. The reverse would apply if costs dropped and charges have to be lowered.

One regulatory lawyer said automatic rate adjustments are in keeping with current economic practices. Many wage contracts and even leases are tied to the government's Consumer Price Index and the same method could be applied to telephone bills, he said.

(Continued on Page 22)

Could Begin by End of Year

WUI Asks FCC Okay on International Data Service

By Ronald A. Frank
Of the CW Staff

NEW YORK – Western Union International, Inc. (WUI) has filed an application with the Federal Communications Commission (FCC) to inaugurate an international data communications service.

If approved by the FCC, service between the U.S. and Austria, France, Italy and Spain could begin by the end of the year.

Called International Digital Data Service (Idds), the service would include simultaneous digital transmissions over both satellite and undersea cable links, providing users with a high degree of reliability, according to a WUI spokesman.

Initial capacity for Idds would include eight major channels of 400 kbit/sec transmission capacity which would multiplex lower speed transmissions ranging through standard data speeds from 50- to 9,600 bit/sec. Dual IBM System/7 CPUs will monitor all Idds transmissions and sample bits for errors.

Under the proposed tariff, no charge will be applied for any block of data received by the customer in which an error is "caused by the international segment" of the Idds link.

WUI's proposed tariff has two components – a service access charge and a usage charge. The monthly access charge will range between $2,365 for service at 50 bit/sec to $6,897 for service at 9,600 bit/sec.

The usage charge will be based on actual transmission, measured in bits by WUI. As an example, 20 hours per month of full-duplex transmission at 2,400 bit/sec will cost $8,446. These are monthly through rates between New York City and France, Italy, Spain or Austria.

A full-time data transfer capability to any one of the four European countries will be available to customers at any one of the following standard speeds: 50-, 75-, 100-, 200-, 600-, 1,200-, 2,400-, 4,800- and 9,600 bit/sec. Other speeds may be offered as required.

Idds will contain dual international transmission links diversified between cable and satellite and dual System/7s at the international carriers' operating centers. Transmission errors between Idds centers will be reduced by the utilization of special code words added to the simultaneous satellite and cable paths at the transmitting Idds center. The receiving center will select the path with the correct code word up to 6,000 times each minute, WUI said.

Data will be transmitted in 500-bit blocks, each of which will have a cyclic redundancy check (CRC) character. Multiplexing of signals will be done by devices provided by Computer Transmission Corp. and Databit modems will be used for asynchronous data.

Code, Terminal Transparent

Idds will be an all-digital service except for domestic segments between the user's location and the WUI terminal. The local segments could be analog or digital, depending on availability from domestic carriers.

Idds will be completely code- and terminal-transparent, according to the WUI spokesman. While the only requirement will be that modems at each end can handle transmissions of the same speed, it will be possible to have modems that are not identical at each end of an Idds link, a spokesman said.

WUI will bill the user for a complete end-to-end monthly service, acting as an agent for the customer with local telecommunications authorities.

Idds will be compatible with the emerging digital systems of the domestic carriers, as well as with conventional offerings. This includes AT&T's Dataphone Digital Service, the Data Transmission Co.'s Datadial and the packet-switched services proposed by Telenet and others.

WUI's FCC application noted agreements have been reached with the French Post and Telecommunication Administration, Italcable in Italy, Compania Telefonica Nacional de Espania in Spain and Radio Austria in Austria.

Interdata Software Lets 7/32 Access Remote Units

OCEANPORT, N.J. – Interdata, Inc. has introduced a data communications software system that permits users to access remote terminals or computers.

Called the Interdata Telecommunications Access Method (Itam), the system adds a new capability to the firm's Model 7/32 processor by providing two levels of communications – a device-independent level, which accesses remote devices as though they were directly attached peripherals, and a device-dependent or basic level for "sophisticated users who wish to provide their own terminal protocols," Interdata said.

The device-independent level not only supports asynchronous terminals such as teletypewriters and CRT displays, but includes a remote job entry (RJE) package that allows users to emulate an IBM Model 2780 or 3780 remote terminal.

The RJE package may also be configured for processor-to-processor communications using binary synchronous protocol, Interdata noted.

Users of this level are able to read and write to remote terminals as though they were local peripherals, the company said. The user only sees the data concerning his application because Itam relieves him of data communications considerations such as line types, protocols and recovery procedures, a spokesman said.

Itam is said to feature data chaining, command chaining, continuous I/O and queue traps in one package. According to Interdata, these features can provide the following capabilities:

- Data chaining provides a high degree of flexibility in buffer management. Variable length data records can be handled by chaining buffers together, i.e., each buffer block is chained to the next by a single address word.
- Command chaining allows several commands to be linked together. The read and write commands, for example, can be chained together, requiring much less system overhead than if each command was issued separately.
- Continuous I/O permits the linking of several functions to minimize system overhead. These include command and data chaining, without intervention from the user task.
- The queue trap feature allows a task that originates an I/O sequence to be deactivated, allowing other tasks to be scheduled and executed while the I/O is being accomplished. When the I/O is completed, the queue trap feature reactivates the original task.

A minimum Itam system includes a Model 7/32 with 65K bytes of memory, OS/32-MT, memory access controller, a real-time clock, a control console and appropriate data set adaptors.

Itam costs $2,500 and will be available in the second quarter of 1975, Interdata said from 2 Crescent Place, 07757.

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Chicago – Jun. 2-3
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Course #1020 –

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This course is a follow-up to Course #1010, with special emphasis on problem solving techniques for minimizing operating costs in commercial data communications networks. Also led by Dr. Dixon Doll, the course covers procedures, approaches and algorithms for evaluating and cost-optimizing network organizations.

This seminar runs three days, and total cost, including an extensive set of customized course materials, luncheons and continental breakfasts is $450. Additional registrants from the same company qualify for a reduced rate of $400. Current schedule is as follows:

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Atlanta	Stouffers Atlanta Inn	April 23-25
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A seminar actually designed to save your installation money.

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Our course leader is Saul Stimler. His book, *Data Processing Systems: their performance, evaluation, measurement, and improvement*, will be an important part of the seminar. As well as case studies, topics that will be covered include:

- *Criteria for quantifying performance* • *Pencil and paper analysis of a system*
- *Benchmarking techniques* • *Realtime, batch, and interactive time sharing systems*

You should attend this seminar if you are a data processing professional or corporate executive whose responsibility it is to plan, benchmark, evaluate, or improve data processing systems.

Cost for the entire seminar, including continental breakfasts, luncheons, and all course materials (including a copy of Saul Stimler's book on the subject) is only $250.

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- Key-disk as a remote batch terminal
- Supervisor functions; motivation
- Mixed Media systems
- Trends in Computer Data Entry

This seminar is lead by Lawrence Feidelman, President of Management Information Corporation, and one of America's leading experts on data entry. All participants will receive a copy of "Data Entry Today", Management Information Corporation's authoritative publication on every aspect of data entry, including a six-month update of this continuing reference service.

You should attend this seminar if you are concerned with optimization of your data entry shop, and especially if you are considering or currently using key-to-storage systems more advanced than basic keypunch. Cost for the 3-day seminar is $350, including continental breakfasts, luncheons, and all course materials. Additional registrants from the same company are charged only $300.

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Terminal Transactions

Dual-Cassette Univac DCT 524 Handles Interactive Functions

BLUE BELL, Pa. – Univac has introduced the DCT 524 data communication terminal for interactive applications.

The DCT 524 combines the features of the earlier DCT 500 data communication terminal with the Series 610 tape cassette system to provide higher speeds in data entry, communication and remote storage applications, Univac said.

The terminal utilizes a data entry keyboard, an incremental printer with print speeds up to 30 char./sec, a control and communications interface unit and the tape cassette system. The DCT 524's design allows the operator to communicate with a CPU at asynchronous speeds of 110-, 150- or 300 bit/sec.

The terminal's Series 610 dual magnetic tape cassette system is a free-standing unit which connects to the control unit as an auxiliary device. It further extends the terminal's capability by providing 864K characters of storage, unattended operation and edit, search and copy capabilities.

The cassette system is available to the terminal operator for off-line data preparation prior to communication and for on-line operation. Dual buffer registers interface for both read and write commands.

The DCT 524 utilizes the standard forms format of up to six parts and offers an optional variable forms control feature, Univac noted.

The DCT 524 may be leased under Univac's standard one-year rental agreement for $181/mo including maintenance, or for $148/mo including maintenance under a 60-month plan. Customers may convert from the 12-month plan to the extended lease plan at any time.

The terminal is priced at $5,042 and first customer deliveries are scheduled for the second quarter of 1975.

Delta Data Releases 4000 Series CRTs

CORNWELLS HEIGHTS, Pa. – A family of microprogrammed video display terminals called the Delta 4000 series has been introduced by Delta Data Systems Corp.

The terminals include operating features such as a 2,048-character paging variable buffer memory; a character set with 96 upper/lower case characters and displayable control commands; eight program function keys; text editing capability; format control; scroll up and down control; read/write cursor addressing; blink, reverse video and blink with reverse video controls. tab function; and printer output.

The inclusion of read-only program memory and a microprogrammed I/O bus structure permits the terminals to communicate with any protocol, code structure or application, the company claimed.

Delivery of the terminals is 60 days and prices start at $2,100 from the firm at Woodhaven Industrial Park, 19020.

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Remote Feature For Tran M4000 Supports 3272s

EL SEGUNDO, Calif. – A remote processing feature for terminals and peripherals working through IBM Model 3272 CRT controllers in remote sites has been introduced by Computer Transmission Corp. (Tran).

The M3272 support capability for Tran's M4000 remote processing system makes it possible for remote IBM 3272 devices or 3272 plug-compatible systems to address a central System 360 or 370 via a single communications line without the use of teleprocessing software or special-purpose front-end processors, the company said.

This means users can capitalize on the faster response times of the 3272 controller over the older 3271, a company spokesman noted.

The M4000's 3272 support feature enables the CPU to view the controller and its associated devices as local terminals, and allows terminals to operate with full-duplex protocol and to communicate directly with the computer.

Terminal Transactions

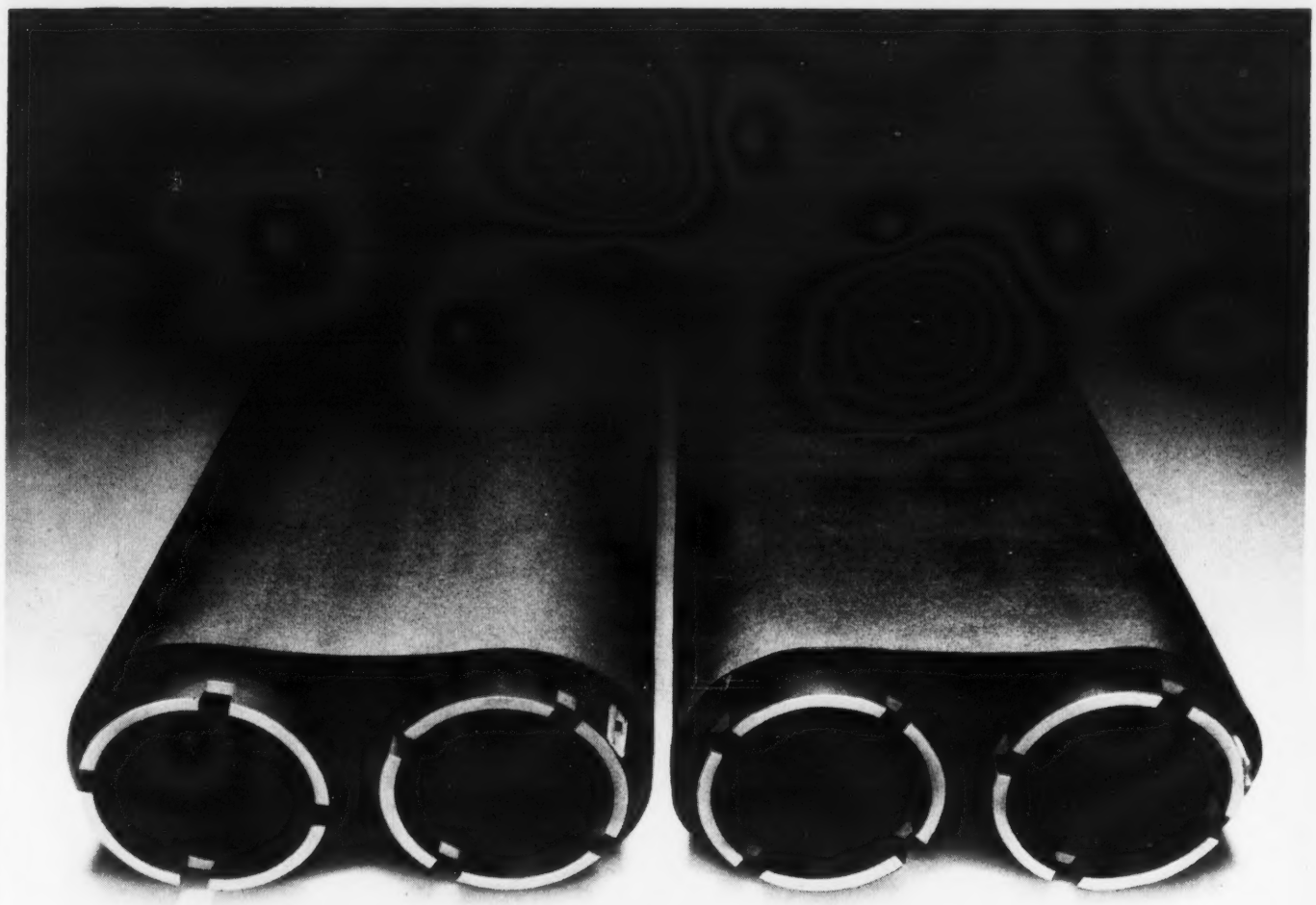
By contrast, the 3271 controller and associated hardware operate with bisync protocol (half-duplex) and all the devices served by the controller in the field require dedicated telephone lines as well as the intermediate support of teleprocessing software and 270X and 370X front-end processors, the firm said.

The concentration techniques employed in the 3272 package make it possible to support the controller and devices such as the 3284 teleprinter and 3277 CRT and to run batch and interactive data concurrently.

The M4000 remote processing system virtually extends the I/O channel of a 360 or 370 into a remote terminal location, regardless of its distance. As a result, the terminals do not require teleprocessing software.

M4000 hardware includes the M4010 channel extension unit (CEU) which is installed at the CPU site and replaces front-end processors, and the M4050 remote device interface.

The feature costs $12,000 from Tran at 2352 Utah Ave., 90245.



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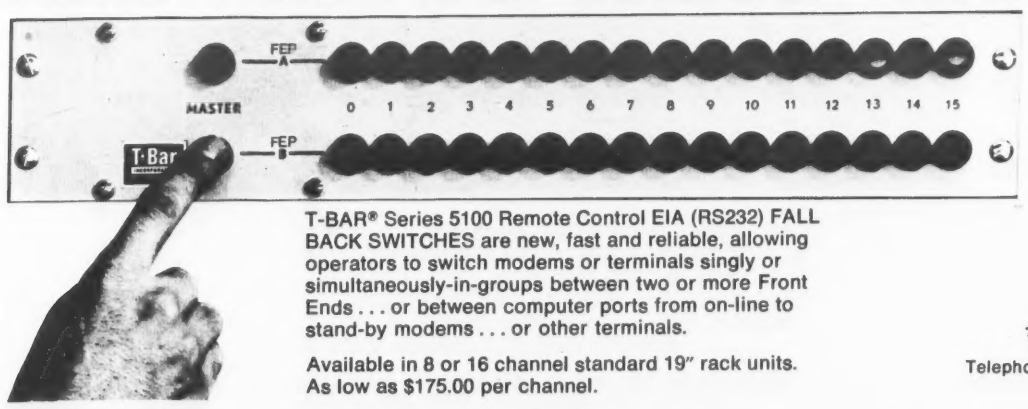

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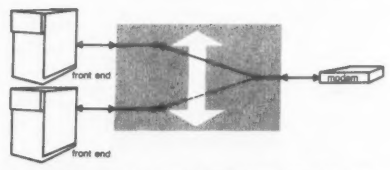

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Caravan Speaker Asserts

TP Rivaling DP in Many Firms Today

By Patrick Ward
Of the CW Staff

ATLANTA – Since the early 1960s, teleprocessing (TP) management has come from nowhere to a position of equality with data processing management in many firms, according to Winston Gregg, systems and programming manager for the Credit Bureau, Inc. (CBI).

Apart from the airlines, most commercial users in the early '60s did not see a need for data communications and could not get the hardware and software to implement it anyway, Gregg told Computer Caravan attendees here recently.

But in the 1966-67 period, IBM introduced its System 360 with standard asynchronous line control, and the IBM 270X transmission control unit and 2260 CRT made TP available to the general business user.

"Companies began to see the role TP could play in their day-to-day business," Gregg recalled. And, with the advent of the 370, "communications ceased to be a part-time job," Gregg said, even though the person handling it still worked under the DP manager.

The DP manager has to be "extremely well-informed about TP" in 1975, Gregg said. In many firms TP is becoming so important that it needs its own executive. Whether these two responsibilities can be confined to one or two people depends on the particular company, he said.

TP Gets High Priority

Gregg's firm has to attach high priority to TP. Using 337 Raytheon PTS 100 CRTs and 992 teletypewriters for on-line inquiries into the firm's three Memorex 1270 control units and IBM 370/168 CPU, CBI supplies credit information to customers across the country.

The message rate is 5,500/hour with an average input of 75 bytes and output of 500 bytes. CBI stores a data base of 22 million records on 60 spindles on Memorex disk drives.

To monitor the response time and reliability of this system, CBI relies on daily system software reports on traffic loads and transaction types, plus daily information from users on response times and their general satisfaction.

A division within CBI concentrates on training terminal users, Gregg said. One of the aims here is to make sure the terminal operators and CBI's TP staff share common terminology.

This is a big help when central site technicans are trying to diagnose and correct local problems, Gregg noted.

The company also stresses in-depth training of its operators, Gregg said, so they can spot hardware and software problems early and determine where the cause lies.

"The name of the [TP] game is to stay up," Gregg remarked.

Changing an existing network is a sore spot for any TP crew, Gregg noted. At CBI, a committee combining DP, TP and field operations management has to approve proposed hardware, software or network changes.

DP management alone might not realize how particular changes could affect TP users, he mentioned.

Once a change is made, Gregg said, the firm's TP staff monitor's its effectiveness, determines user satisfaction and then takes follow-up action if necessary.

Automatic Rate Hikes Could Affect Users

(Continued from Page 16)

Aside from establishing an exact formula to fix rate adjustments, the key question would be whether an FCC commissioner would agree to "abrogate his rate review responsibility" to an automatic process, the attorney said.

Before such a question could be answered, basic principles concerning the responsibility of both the FCC and regulated common carriers would have to be carefully examined. "I don't think such a change could take place without appropriate legislation," one source said.

In discussing automatic rate adjustments, most experts drew an analogy between Bell and the electric utilities, which have initiated automatic fuel adjustment clauses in many states. As the cost of fuel to generate electricity changes from month to month, the fuel charge is adjusted accordingly.

The outlook for the future of automatic rate adjustments is unclear. If Bell is successful in the states, a proposal would then come before the FCC.

Officially, an AT&T spokesman said he knew of no plans for such a proposal. Bell recently filed a request for an interstate rate increase and any other proposals would be unlikely, he added.

The experts do agree on one point – any proposal for automatic rate adjustments on either the intra- or interstate level puts the phone user at a disadvantage.

"Unless consumers have the resources to fight such proposals, it will be difficult for them to protect their interests," the regulatory attorney warned.

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Decision Data's SP0010 Converter

Off-Line System Converts Punched Tape to Cards

HORSHAM, Pa. – An off-line subsystem for conversion of punched paper tape into 80-column punched cards has been developed by Decision Data Computer Corp.

The SP0010 paper tape reader does not require computer operation, previously necessary to convert from tape to cards. It is designed to read industry standard paper tape codes and convert that data into Hollerith code on 80-column cards at a rate of 45- to 75 card/min using a Decision Data 8010 interpreting data recorder.

The tape reader can be tabletop mounted within 10 feet of the data recorder. All standard operations of the data recorder are provided, including programming functions.

Additional systems are currently under development which will enable conversion of punched paper tape to 96-column cards, conversion of punched cards to punched paper tape and reading of tape or cards directly into a computer, said Frank H. McPherson, vice-president, marketing.

The system sells for approximately $16,000 from the company at 100 Witmer Road, 19044.

Itel Interfaces IBM 360/50 To Full-Speed 3330-Type Drive

By Vic Farmer
Of the CW Staff

SAN FRANCISCO – While Itel has installed a number of 3330-type disk drives on 360/65s, the firm found in the past the 360/50 could just not handle the 806-kbyte data transfer rate of the 370 drive.

But, believe it or not, the firm recently found IBM itself has opened the door to the interfacing of full-speed 3330-type drives to the 360/50.

Previously, Itel interfaced its 3330-type drives to the 50 merely by changing the motor driving the pack so it rotated at 2,800 rev/min instead of 3,600 rev/min.

This gave the 50 user a data transfer rate of 625 kbyte instead of the full 806-kbyte data rate of the 3330-equivalent while using a compatible disk pack.

As it turned out, Information Storage Systems Division of Univac (ISS), the firm which supplies the 3330-type drives to Itel, had not tested its drives on a fully updated 360/50.

Engineering changes (EC) from IBM, including one that allowed the more efficient use of the IBM 1419 magnetic character reader on the 50, provided the 50 with increased capability to handle the 806-kbyte data rate. The ECs generally take care of some of the timing problems the full-speed 3330-type disks would ordinarily have had, according to an Itel spokesman.

When ISS did test the full-speed 3330-type drive on an up-to-date 50, it worked reasonably well.

Hard Overrun Problem Solved

But the ECs alone were not the complete answer. One problem – the hard overrun situation – was solved with an additional software routine.

Hard overrun occurs when the combined data rate coming into the 50 is over even the fully upgraded capacity of the machine. And so, the data on the disk arrives under the read/write head before the CPU is able to read it.

The software routine, therefore, increases the number of attempts made to recover the information. Itel said the routine works 100% of the time.

Can Slow Throughput

Itel did acknowledge, however, heavy use of the routine could slow down the throughput. But the difference in speed between the rotation of the 2,800 rev/min slow drive and the 3,600 rev/min full-speed drive allows the users to reread data one out of 10 times and be no worse off than when using the slow-speed device all the time, the spokesman said.

Itel claimed, moreover, this hard overrun situation is an extremely rare occurence.

The full-speed disks are presently installed at San Jose Hospital in San Jose, Calif.

Itel now is testing its slow-speed 3330-type disk on the Model 40 and a 3330-11-type drive on the 360/65.

The full-speed controller for the 50 is priced at $75,600 or $1,750/mo on a two-year lease, and drives are priced at $22,480 or $570/mo on a two-year lease. Itel is at One Embarcadero Center, 94111.

At Monroe County

Firm Gets to Audition New Application

ROCHESTER, N.Y. – Sometimes it's easier to test a new application either by using a service bureau or someone else's system which has the application up and running.

Testing an application on someone else's system is just what Monroe County did to produce its 532-page 1975 budget plan book this year. The application proved its worth and is now being added to the county's system.

Working with Lawyers Co-operative Publishing Company (LCP), one of the largest publishers of law books in the U.S., Monroe County's budget department cut the cost of producing the budget plan more than 40% over last year, according to county manager, Lucien Morien.

"We saved considerable time and effort by using DP equipment. In the past, when we used manual typesetting and editing methods, budget additions, cuts and grant changes caused substantial delays. Frequently, we had to type, retype and revise entire sections of the book because of relatively minor copy changes," said Edward Gallagher, Monroe County's budget director.

Linked to 370/145

To give the county budget department access to a computer with text-editing capabilities, LCP temporarily installed one of its IBM 2741 terminals in the county's downtown Rochester office. The terminal was linked by telephone lines to an IBM 370/145 in the publishing company's plant, 13 miles away in Webster, N.Y.

Two Monroe County employees, trained by LCP, entered financial and text data into the system. An administrative terminal system (ATS) program set the paragraphs, column width and spacing. Then the computer printed a draft of the budget plan in book format.

Following some revisons and last-minute changes, the computer printed proof copies of the book at 600 line/min. A local printer, who photocopied the text and financial data, ran off 500 copies of the book for distribution to county legislators and department directors.

"We were very impressed with the computer's capabilities, and, as a result of our experience in publishing the budget book, we have programmed text-editing into our own computers," said William Finch, county director of DP.

"We anticipate considerable use of these programs in the preparation of numerous legal contracts and documents by county departments. And we expect to prepare and edit future budget books exclusively with county computers," he said.

'Fast Tilting' Software Routine Raises Gould COM Throughput 15%

NEWTON, Mass. – The total throughput speed for all Gould Computer Output Microfilm (COM) systems has been improved by 15%, according to the company.

This increase in speed was achieved by Gould's introduction of a Fast Titling software package, which reduces the time necessary to produce eye-readable fiche titles to less than one-third the old rate on standard print image tapes, the firm said.

This package is said to maintain the flexibility of the current package and the quality of the characters produced. It can be utilized on both the Beta COM 700L and 800, including those already in use, at no charge.

The company is at 20 Ossipee Road, 02164.

EWC 'Destroyit' Shreds Printouts at 90 Ft/Min

NEW YORK – The Destroyit Data-16-in. from Electric Wastebasket Corp. (EWC) will shred printouts and continuous forms at 90 ft/min – about 1,000 pounds per hour.

The 16-in. throat takes multiple sets of computer printouts of any width, including carbons, paper and cards without clips and staples removed, and plastic credit identification cards, film and microfiche. Up to 25 single sheets can be fed simultaneously.

The unit is priced at $1,595 from the firm at 145 W. 45th St., 10036.

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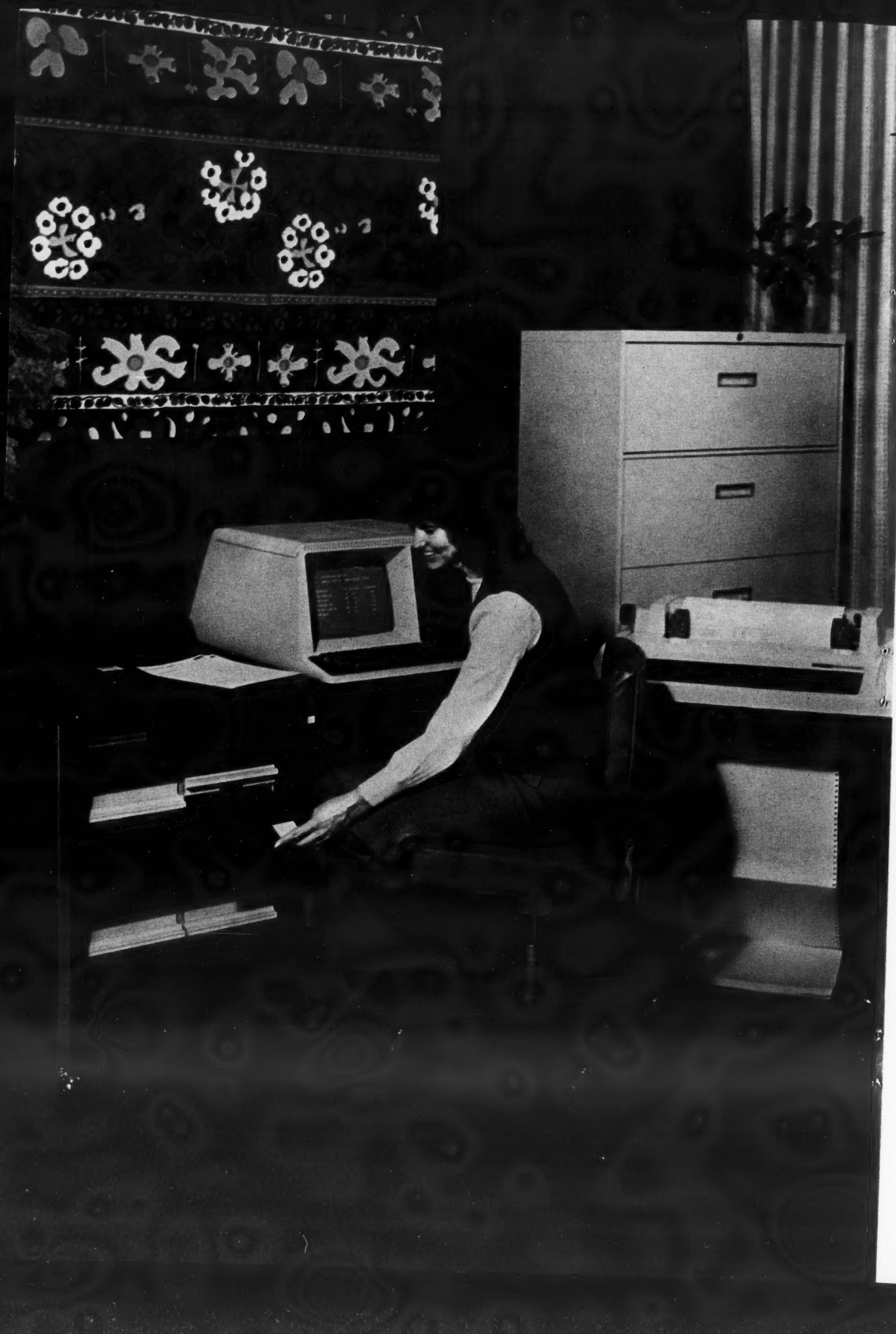

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Shorter Work Week Eased by Planning Firm's Upgrade

BLOOMINGTON, Minn. – The firm of Ellerbe Architects/Engineers/Planners, although operating on a short work week, manages to do more work in four days than many organizations accomplish in five . . . and that's mainly due to the recent upgrade of the firm's DP system.

In a normal four-week period, Ellerbe maintains between 300 and 400 active projects. One of the resources Ellerbe people use to produce more output in a shorter work week is their computer, which they operate as if they invented it.

"The computer supports a range of functions in our diversified operations, and it helps our people to be more productive – especially the professional staff," Ken Mahal, president and chief executive officer, noted.

"Measured in terms of man-hours of work output, our productivity now is sharply higher than it was when we worked the conventional five-day week."

The computer's role at the busy firm, already pervasive, is being expanded. According to Nabi Hashmi, DP director, it will play a considerably larger role now that Ellerbe has installed an IBM 370/115.

"The Model 115 replacing our previous IBM 1130 opens up a clear path to expanded DP productivity," Hashmi explained. "With it, we can take much greater advantage of data base and integrated systems concepts and reduce the time and costs of building data base and creating programs.

"Teleprocessing will enable us to extend computer power out to our network of regional offices and to provide management direct access to what is happening in terms of projects, costs and progress," he said.

"We enjoy a better balance between business and scientific DP and now have the opportunity to capitalize on the advantages of computer graphics by applying the small 370's data base to produce lines and drawings as well as words and reports."

The data base concept – information centrally maintained, continuously updated and made readily available – is important in Ellerbe's large and diverse operations.

The existing data base is extensive. It includes a project information master file that contains descriptive information as well as detailed budget, time, manpower, cost and progress data on each of 2,500 active and recently completed client projects.

Flowing from the client project data base are project progress summaries, actual-vs.-estimated cost reports, schedules and delay notices. The objective is to closely apprise everyone concerned.

A by-product of computer processing of the client project data base is manpower requirements forecasting and planning.

A critical path schedule is processed with the project file data to generate the correct sequence of project activities and to expedite work by flagging actual delays and potential bottlenecks.

An employee master work file is another key element in the Ellerbe data base. The file is a comprehensive log of each employee's daily work activity – hours worked, time applied to specific client projects, project assignments completed and new work assignments. Accumulated on computer-produced daily time cards, the data is processed by the Model 115 and labor charges applied by individual client project.

Another segment of the data base, an inventory master file, performs a similar cost allocation, this one based on daily utilization of peripheral services and supplies such as blueprints, reproduction graphics and feasibility studies. In this way all valid costs, whether professional or clerical employee time, supplies or services utilization, are applied against the corresponding client projects.

The interrelationship between the three key master files is obvious, Hashmi noted. "With the 370/115 and IBM's Vandl/1 data base manager programming, we can integrate the various file set portions of the data base on a very relevant and dynamic basis.

"Further, using the computer's on-line inquiry capability, we can instantly tap the data base information whenever it is needed – for project, manpower, cost control and planning purposes," he explained.

The data base management and high-level language capabilities of Vandl/1 allows the firm to refine and integrate even more complex elements into the Ellerbe data base, according to Hashmi. A statistical history file, for example, is being created to house information about major projects handled by Ellerbe over a five-year period.

Slated to be used for reference in planning new projects or to assay the feasibility of proposals, the project profile will include design approaches, costs, manpower statistics and problem areas.

Another data base element under creation is a contractor master file detailing the performance record of all contractors – prime and subcontractors – who have worked on Ellerbe projects. Information from these two files, the statistical history file and the contractor performance file, will be combined; the statistical history file, likewise, can be combined with information from Ellerbe's existing marketing analysis and reporting system which keeps track of new architectural and engineering projects on a city-to-city basis is used to put priorities on the company's marketing efforts.

Ellerbe's largest data base element encompasses the record files and associated processing routines that support the engineering side of the firm's activities. The master files cover all aspects of construction specifications – steels, concrete, floors, windows, walls, doors, etc.

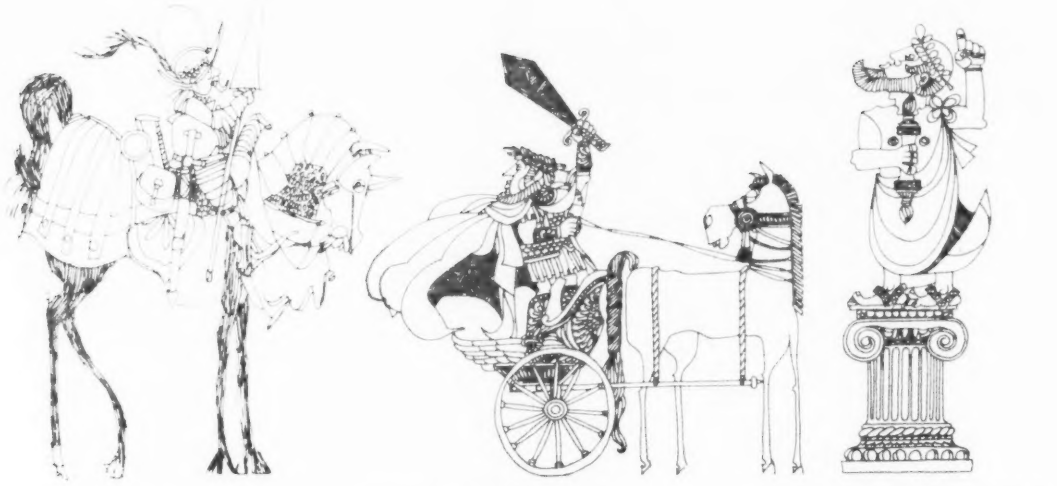
Project specifications are drawn by the 370/115 from construction specification files, saving large amounts of time and resulting in better individual project specifications.

CFI Package Cleans 3740-Type Diskettes

ANAHEIM, Calif. – CFI Memories, Inc. has selected packaging as the means of improving performance and life expectancy of a floppy disk. CFI's claimed its package for the IBM 3740-compatible diskette continually cleans the disk surface as it rotates.

Better cleaning is due to spot-bonding the tissue liner in a pattern that permits the tissue to be drawn against the spinning disk, the company said.

The diskettes are packaged five to a box to prevent crowding and to maintain flatness when boxes are stored on their sides. Diskettes are priced at $650 each from the firm at 305 Crescent Way, 92801.



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MINIWORLD

Turnaround Card Processing Unit Works With Mini

MELBOURNE, Fla. – Minicomputer and small business systems users can process turnaround document applications, such as utility bills and credit card invoices, with a subsystem from Documation, Inc.

The LC50 card-processing subsystem is a modular card processor. The machine is capable of punching, reading and printing multiple lines on either 80- or 51-column data cards.

The subsystem uses a building block design concept. There are individual modules for punch, read, single-line printer and multiline printers. With the exception of the multiline print device, all features can be field-installed, Documation said.

Depending upon the desired features, the price of the LC50 ranges from $7,500 to $14,000.

The basic configuration of the subsystem is a 50 card/min punch that has single 1,000-card capacity input and 850-card capacity output hoppers plus a 100-card capacity reject pocket.

The options offered include a second input hopper and second output stacker, postpunch and prepunch read stations, 51-column card capability, a single-line print mechanism that can print any of 64 characters in the 80-column positions above the 12-punch row and a multiline printer.

The multiline printer prints from one to 12 lines of up to 64 characters from a 64-character set. Twelve 64-character buffers allow the selection of any or all of the 12 lines with complete flexibility in formatting, the company said.

As a punch, reader/punch, or printer/reader/punch, the speed of the subsystem increases inversely with the number of columns punched or printed. In read-only mode, the subsystem operates at 300 card/min.

The creation of a host system interface

Documation LC50 Card-Processing Subsystem

logic is said to be greatly simplified because the many combinations of functions and internal controls are handled by an installed microprocessor.

Completely Buffered

The LC50 is completely buffered and all data exchanges are verified with longitudinal and vertical redundancy checking as well as checking valid code structures.

In addition, the microprogrammed controller can detect and correct any punch errors generated by the system without intervention by either the host system or the operator and without stopping the machine.

The system also offers switch-selectable off-line functions of reproducing, gang punching and/or printing, all under the control of the microprocessor, Documation noted.

The firm can be reached through P.O. Box 1240, 32901.

Delays Abound But...

College Converts to 7/32

By Edith Holmes
Of the CW Staff

CARLISLE, Pa. – After months of delay caused by hardware and software difficulties hampered by a particularly slow mail service, a small liberal arts college here finally has its Interdata 7/32 up and running.

Too little core, a "termite-ridden" operating system and delays of up to a week in the mailed exchanges of software and error documentation between Interdata and Dickinson College kept the minicomputer system down for nearly three months, according to Michael O'Heeron, director of academic computing for the school.

Now that the mainframe is operating, the school of approximately 1,700 students must begin a "crash conversion" of administrative applications from its present IBM 1130 to the minicomputer and complete preparations for the interactive system to serve academic users, he said.

Dickinson received one of the first 7/32s issued on Oct. 15 of last year. But initial efforts to get the machine operating indicated the 64K core was too small.

"Requiring 40K, the OS/32-ST operating system took up too much room," O'Heeron explained. "We just squeezed in the Fortran compiler, but then had no space left over for a simple table storage."

Interdata installed a new memory of 96K and, once some difficulties with a tape interface, five or six hardware changes and a cable with crossed wires were solved, "the hardware ran like a top," Don Souder, director of administrative computing for Dickinson noted.

But both O'Heeron and Souder are concerned with the software development accompanying the minicomputer. Interdata's first release of the 7/32 operating system was "bad news," in O'Heeron's view, but it has since been replaced by the vendor. Souder noted he anticipates doing much of his applications software in-house.

O'Heeron added, however, that the Fortran software from Interdata had "no problems we couldn't live with" and the prerelease version of the vendor's Basic system was "pretty clean."

Lion's Share . . . U.S. Mail

Beyond the initial hardware and software headaches, the director for academic computing attributed the lion's share of the delay to the U.S. mails. "Though Interdata is located in Oceanport, N.J., only 170 miles from Dickinson, mailed communications took a minimum of two to three days each way – and sometimes as long as a week," O'Heeron said. "The Christmas mails slowed us down still further."

Despite this handicap, neither director complained about the service support provided by Interdata. When O'Heeron places a phone call instead of sending a letter about a problem, he said, the vendor typically has service people working on-site that same day.

"On two or three occasions," he commented, "the company has sent task forces to Carlisle."

Considered Variety of Systems

Dickinson looked into a variety of options before selecting the 7/32 but found "other vendors couldn't give us what we needed for the right price," O'Heeron said. The college required an interactive system priced at $60,000 or less to serve its academic and administrative users, both of whom are relatively unsophisticated in computing but require complicated applications.

In addition, O'Heeron said, he wanted a 32-bit machine, some of the IBM 360 instruction set, the capacity for multitasking, floating-point hardware and a configuration permitting modular growth. "We wanted something that would last a good 10 to 15 years," he said.

In investigating the possibilities, the college evaluated Digital Equipment Corp.'s PDP 11/40 and 11/45, the Hewlett-Packard 3000 and 2100 series, Digital Scientific's MetaFour, the Burroughs 5500, IBM's 370/135, Texas Instruments' 980, Prime's 300 and a Data General mini.

(Continued on Page 30)

IMS Head/Track Disk System Gives Novas 128K Words Extra

ANAHEIM, Calif. – Data General's Nova and Digital Computer Control's DCC 116 minicomputers can now be equipped with a high-performance, 128K word disk system from Intelligent Memory Systems (IMS) for $3,200.

The fast random access of the IMS head-per-track disk permits users to conserve mainframe memory through the use of overlay, swapping and virtual memory operations, IMS said.

Any block of 256 words is said to be randomly addressable in 16.7 msec. Data transfer rate is 67K 16-bit word/sec or 15 μsec/word. One disk drive provides a capacity of 128K words.

The controller, which handles DMA transfers, plugs into one CPU slot. It controls up to four drives, giving a maximum capacity of 512K words.

The IMS system is transparent to Data General and Digital Computer Control software and compatible with DOS and RDOS, IMS said. It operates on the same instruction set as the Data General 4019 disk controller, causing the IMS disk to appear exactly as the Nova disk to the CPU, IMS said.

The $3,200 price tag includes controller, disk drive and interconnection cable. IMS is at 1630-O S. Sunkist St., 92806.

Selectrics Interfaced to PDP-8s

HOUSTON – IBM Selectric typewriters can be interfaced to Digital Equipment Corp.'s PDP-8s through an interface controller from Totalert Systems, Inc.

Single Board

The controller is designed on a single printed circuit board and allows the operator to input data to the PDP-8 through the typewriter or to output data on the typewriter from the minicomputer.

As many as four controllers can be used with a single system to interface four typewriters.

The interface controller is said to be easily adaptable to other computers. Linkage to the Selectric is through a 35-ft multiple-shielded, twisted-pair cable. The typewriter cable has a card-edge connector.

Software Executive

In addition, a software executive driver package which allows highly flexible I/O and data management, has been developed for the controller, the company said.

Cost of the controller is over $800 from the firm at 2001 K. Karbach, 77018.

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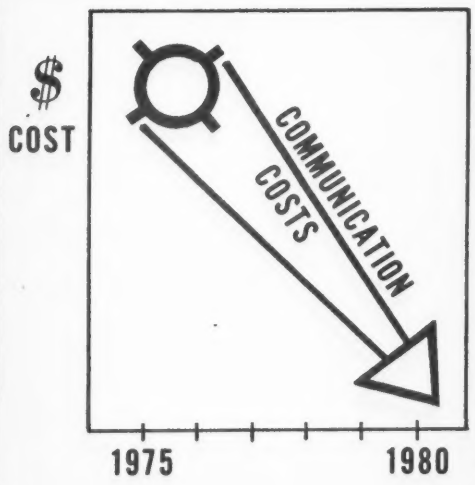

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Small College Finally Gets Its 7/32 Up After Solving Months of Difficulties

(Continued from Page 27)

The school also considered purchasing its computing service from nearby Pennsylvania State University or Franklin and Marshall College, O'Heeron recalled.

"Next to the Interdata 7/32, Prime's 300 came closest to being able to service us," he said. But when all was said and done, the 7/32 – for under $10,000 – seemed to fit the school's primary requirements.

In addition to the mainframe, the system depends on a Mohawk 400 card/min card reader, a 200 line/min Dataprinter unit and Pertec's 45 in./sec magnetic tape unit.

Plans to Acquire Terminals

O'Heeron indicated the college is also planning terminal acquisitions to satisfy its academic users. "Right now, we're looking at Infoton's Vistar/GT. It's not the best terminal, certainly not the cheapest, but it's simple, rugged and has service support out of Camp Hill," a neighboring town, he said.

"Whatever we choose will be the first interactive terminal on campus, so we want to be somewhat conservative in our selection," he added.

Eventually O'Heeron plans to have several terminals, including a few teleprinters, distributed throughout the campus. He said the system would probably rely on Rixon modems and leased lines.

Hoping to begin multitasking implementation in June, O'Heeron noted the system still lacks a memory access controller to define and automatically reallocate problem space.

"This device will provide us with absolute protection of a program; a user won't be able to get out of the allocated partition," he said, "and in a student environment that's tremendous."

In the long run, O'Heeron envisions a system of some 200 to 300 terminals linked to five to 10 processors located remotely. "By then, we'll probably want to go to an Interdata 8/32. This machine would be the superior, but not the controlling CPU in the system," he said.

But before such dreams can even be discussed, O'Heeron recognizes that Dickinson must complete the conversion of the administrative system to the 7/32 and find a buyer for its 1130.

Souder hopes this transition will be quick: "There has been considerable dissatisfaction on campus with the installation of the 7/32. Many on the faculty and in the administration remember one day in 1967 when the 1130 was wheeled in and was up and running a few hours later."

Souder anticipates the 7/32 will require "someone who really knows what's going on in the machine.

"With the 1130, we just pushed a button and watched it go," and IBM encouraged its users to refer all maintenance problems to the vendor, he explained. "But Interdata seems to expect us to do most of our own maintenance."

Interdata also seems to recognize the needs of what it describes as its "typical 7/32 user," however.

"Certainly, the college requires more than just the shipment of the machine," a spokesman for the company said. "It needs and will receive attention on our part beyond the initial weeks of installation."

DEC 1117-M Gives Factory Control

MAYNARD, Mass. – A real-time industrial minicomputer system priced 15% less than previously available equivalent systems has been announced by Digital Equipment Corp. Called the Industrial 1117-M, it is designed for factory data acquisition and control applications.

Priced under $33,000, the system offers a PDP-11/10 with 28K words of core memory, dual disk drives, a keyboard terminal and industrial process I/O, an interfacing subsystem. Software supplied with the system consists of DEC's operating system, RSX-11M.

Control of more than 3,000 data points can be provided by the interface, DEC added.

Audition a new market in London this spring.

Computermarket, sponsored by The Computer Caravan, is an excellent and economical way for you to "test market" your EDP products and services in the United Kingdom. There are four major cities in the entire 1975 Computermarket tour. The fourth stop is London (Apr 28-30), the **Computermarket** city highest in concentration of buying influences. As a special offering to companies that are considering entry into the UK market, the London Computermarket show is open to new exhibitors at a very low cost. The United Kingdom is a fast-growing new market for EDP goods and services. The English use computers almost as extensively as we do in the U.S., and the English are receptive to new American business. If you'd like to test the growing United Kingdom market for yourself, efficiently and economically, then you should look into the London **Computermarket.** Here's why:

1. **Computermarket** is the only computer exhibition to appear in London for the first 10 months of this year. Many high-level computer professionals, including Managing Directors and Corporate Executives, will be visiting **Computermarket** to participate in the forums and discuss their needs with representatives on the exhibit floor.
2. **Computermarket** is sponsored by The Computer Caravan, and the same program that has worked so successfully for Caravan Exhibitors in the U.S. is being applied in the U.K.
3. **Computermarket** takes care of all logistics and promotion for the show for one package price. All you need to do is ship your equipment to the exhibit site in London, and then you can concentrate on your exhibit participation. The **Computermarket** professionals take care of the rest. We can even print your booth graphics. For an extra cost, our artists will work with your layout and materials to prepare every facet of your **Computermarket** presentation, including display photos and copy for your booth wall, and hand-out sales materials for your exhibit staff.

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Digital Equipment Co.	**Lynwood Scientific**	**Redifon**	**Varian**
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Computermarket provides you with virtually everything you'll need to conduct an effective "test market" of the United Kingdom, yet the cost is surprisingly low. The complete **Computermarket** package price for the London Exhibition is just $2,000 (not including extra graphics work). To get all the details on how you can participate in the 1975 London Computermarket, just fill in the coupon. Or, you can contact **Computermarket** directly by calling Michael Young in London at Computerworld Publications Limited, 140/146 Camden Street, London NW1. Telephone: 01-485-2248.

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DDC Adds Two Memory Systems

SAN DIEGO – Digital Development Corp.'s (DDC) two fixed-head disk memory systems, the System 60 and 90, have average access times of 8.5- and 17 msec respectively with capacities ranging from 1M to 38M bits.

The Systems 60 and 90 are self-contained with electronics for reading, writing, track selection and timing generation. The systems' flying-head assembly has proven highly reliable, the equivalent of 14 years start-stop-start operation with no reduction in performance, the firm claimed.

A System 60 with a capacity of 2.4M bits costs $4,400; a System 90 with 4.8M bits is also priced at $4,400.

Interfaces for most minis are available. An interface to a Data General Nova costs $2,500, while a Digital Equipment Corp. PDP-11 interface costs $5,000.

DDC is at 8615 Balboa Ave., 92123.

'Adam' Works With Naive Users

BURLINGAME, Calif. – Adam is a small business system that uses English as its language and thus eliminates the need for professional programming, according to its vendor, John Peers & Co., Inc.

The small system "learns" the meaning of new words in terms of previously learned words when the user "teaches" the system at the keyboard, the vendor said.

The system is factory-programmed to recognize about 50 English terms.

Adam is built around a GRI Computer Corp. minicomputer. It offers removable 5M-character files and elimination of special power, humidity, filter and cooling system requirements, the firm said.

The system costs $39,500 from the firm at 887-A Mitten Road, 94010.

Cassette Recorders Write in Ansi, Ecma

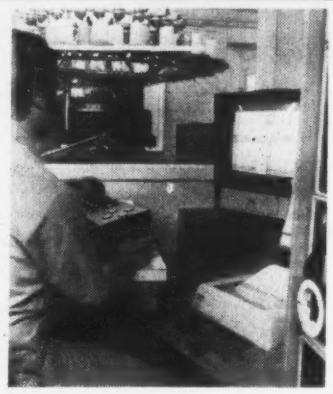
NEWTON, Mass. – Memodyne Corp. has announced the 800 series of cassette recording systems for use in writing magnetic tape cassette information in phase-encoded Ansi/Ecma formats.

Data can be transmitted from the tape to terminals, such as Texas Instrument's 700 series, for direct printout of the data as recorded; for putting the tape in RS-232C format; or for acoustically coupling to computer facilities and other devices having the ability to copy and edit tapes, the company said.

Modular Packaging

The basic 800 system contains a transport, a write/step card and an Ansi formatter card assembled in a card cage. Modular packaging provides CMOS electronics for 8-bit keyboard, 40-bit parallel, digital panel meter, analog signals and other instrument and keyboard applications.

The typical 800 is priced from $745 from Memodyne at 375 Elliott St., 02164.



Fabric is designed on a mini-controlled system at Uxbridge Knitting Mills and the process, which used to take days, has been reduced to minutes or hours by the minicomputer.

Mini Slashes Fabric Design Time At Uxbridge Mills

UXBRIDGE, Mass. – New fabric patterns are difficult to develop on the standard mechanical knitting machine and often require as long as three days from design conception to production. At Uxbridge Knitting Mills here, the process is often accomplished in a matter of hours or even minutes; customers arrive at the mill with sketches and often leave within two days with their entire line design completed.

Pattern development is accomplished by a pair of electronic knitting machines controlled by a Digital Equipment Corp. PDP-11/20. To design by computer, sketches are placed on an electronic tablet linked to the graphic CRT display and the minicomputer.

Coordinates for pattern area and video screen size are plotted, then mapped in with an electrostatic stylus. Progress is monitored on a color screen.

As the design takes sahpe, stitching information is recorded in the PDP-11/20 core memory for storage on tape. If the customer or the mill wants a sample, the stitching data is read onto the system's disk, instructions are typed on the console and the minicomputer starts the knitting machine.

Corrections and adjustments are also handled by the mini. A pattern is recalled to the CRT screen, and the operator can correct or adjust a design with the electrostatic stylus. The computer is then signaled to resume production.

With older methods, such alterations would have required a total shutdown of the machinery for disk replacement.

The electronic knitting machines controlled by the PDP-11/20 are used almost exclusively for pattern and fabric development rather than for production. The machines not only facilitate design, but have the capability to knit as many as four patterns simultaneously on the same fabric.

DX980...the operable system from Texas Instruments

The most powerful operating system for a minicomputer is also one of the easiest to use. Why? Check these features... "cookbook" job control language, sophisticated file management for three file types, 400-megabyte disc capacity...and more!

DX980 general-purpose operating system supports TI's Model 980 series minicomputers in various applications including batch processing, interactive terminal processing and real-time applications...simultaneously or each one individually.

System Description

DX980 features a modular organization. General executive functions are included in the nucleus, while specialized functions are embodied in the subsystems.

With this arrangement DX980 can efficiently manage multijob, multitask, memory, and I/O functions...all concurrently. In addition, the system contains a sophisticated file management feature for handling linked sequential, relative record, and key indexed files.

Another important feature of DX980 is system resource management, which includes dynamic memory allocation.

These features combined make DX980 ideal for multiprogramming applications using Fortran IV or assembly language for any number of large arithmetic operations.

Supporting Software

For such applications, supporting software includes a Fortran IV compiler; SAPG, a two-pass assembler; and DXOLE, an overlay link editor, in addition to a number of utility modules.

Hardware

The hardware configuration needed for these requirements is designed around a TI Model 980 series minicomputer with supporting peripherals. A general-purpose system capable of interactive terminal processing and batch processing could include four TI Model 912 Video Display Terminals, a moving-head disc with 2.28 million bytes of storage, a TI Model 979 magnetic tape drive, a 980B computer with 48K 16-bit words of error-correcting MOS memory, a "Silent 700*" Model 733 ASR Data Terminal, a 132-column medium duty line printer, a 300-cpm card reader... and, of course, DX980 operating system. This configuration enables users to have a $65,500 minicomputer system that can support tasks normally assigned to computer systems costing $100,000 or more.

This just may be the best bargain you have come across for your application. To find out more, contact the sales office nearest you. Or write Texas Instruments Incorporated, P.O. Box 1444, M/S 784, Houston, Texas 77001. Or call (512) 258-5121, Computer Systems Marketing.

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Tests on 4K RAM Chips Show Low Failure Rates

CUPERTINO, Calif. – Over 6-1/2 million hours of 4K random-access memory (RAM) component testing on minicomputers with semiconductor memories were summarized recently by Robert J. Frankenberg, engineering section manager in Hewlett-Packard's (HP) Data Systems Division.

"The RAMs have demonstrated a failure rate of only .11% per 1,000 hours, giving semiconductor-memory minicomputers a reliability improvement factor of 1.5 to 1.6 over the scores experienced with earlier core-based minis," Frankenberg stated.

The test period lasted from August through December last year. Over 6-1/2 million hours were accumulated on more than 12,400 4K RAMs of 22-pin configuration supplied to HP by Texas Instruments. This involved over 52,000 test hours on computers and over 194,000 hours on 8K-word memory modules.

Approximately 100 HP 21MX minicomputers were used in the test, with 20 totally dedicated to the test program. Average test time was over 1,600 hours.

"With larger volume of chip production we look for a failure rate of something like a .05% per 1,000 hours by early 1976," he continued. "That would adjust our reliability improvement factors to perhaps 2 for the larger memory machines."

While HP does not specify mean time between failure (MTBF) for its products, the engineering evaluation tests showed an MTBF rate of 5,880 hours for 8K-word systems.

This marked a 57% improvement over a 2100A core memory minicomputer. If the .05% failure rate is achieved, this would improve to 6,600 hours, HP said.

Interdata Designs Two Systems For Work in Scientific Milieu

OCEANPORT, N.J. – Interdata, Inc. has introduced two systems for scientific data processing in research and development programs.

The 16-bit systems, Interdata RD 800 and RD 850, feature Interdata Model 80 and 85 CPUs as well as special hardware and software configured for scientific processing.

The RD systems are the first packages developed by Interdata to address the specific needs of a particular group of users. Each RD system includes a CPU with 32K, 48K or 64K bytes of MOS memory, floating point, power fail protect, a CRT terminal and 2.5M-byte disk drive with appropriate interfaces.

Standard software includes Assembly language, Fortran IV, Basic and a disk operating system.

Both RD systems are built around an architecture configured for high-speed numerical analysis. Their processors feature 16 general-purpose registers (15 of which may be used as index registers), 255 interrupt levels, signed multiply/divide, floating point, 255 vectored interrupts and an average memory cycle time of 270 nsec.

The difference between the RD 800 and the RD 850 systems is that the 850 system includes 4K bytes of Dynamic Control Store (DCS). The DCS module, with a cycle time of 60 nsec, can be used for user-alterable microprogramming in situations requiring high-speed, specially-designed algorithms.

Sixteen automatic vectors simplify user access and modificaton of DCS based on algorithms, Interdata said.

The systems are priced from $32,400 to $42,525 including installation and six-months maintenance. Interdata is at 2 Crescent Place, 07757.

2.5M-Byte Drive Unit Uses IBM 2315 Disks

OCEANPORT, N.J. – A 2.5M-byte fixed disk drive system from Interdata, Inc. uses an IBM 2315 disk or equivalent.

The disk controller interfaces to all Interdata 16-bit and 32-bit processors. It operates with a selector channel for autonomous block transfers and also permits simultaneous seek, overlapping seek and data transfers in multiple disk drive configurations to minimize access times.

The disk has an average access time of 70 msec and track-to-track access times of 15 msec. Data transfers take place at the rate of 195K char./sec in block sizes from 256 bytes to 12K bytes, the company said.

The disk contains a single platter with data recorded at 2,200 bit/in. on 203 tracks on each surface. Data on each track is divided into 24 equal sectors which include four main fields: sync, two-byte header and a 256-byte and 16-bit cyclic check fields.

The drive is priced at $7,200 from the firm at 2 Crescent Place, 07757.

Digitizer Interfaced To DEC's PDP-8 Line

FAIRFIELD, Conn. – Summagraphics Corp. has interfaced its Data-Tablet digitizers with the PDP-8 line of Digital Equipment Corp. The interface, a single PC board, occupies one Omnibus slot of a PDP-8.

The interface transfers X-Y coordinate information from the Summagraphics controller to the PDP-8 and operates in either programmed I/O or interrupt mode. Eight I/O instructions permit flexible program operation in either mode, and a multiplexer is available for linking up to 16 tablet digitizers to a single PDP-8.

The Summagraphics tablet digitizers, in standard sizes from 11 in. by 11 in. to 36 in. by 48 in., operate with a resolution of 100 line/in.

The interface, wtih a 10-ft flat connecting cable, is $1,250 from the firm, which can be reached through Box 781, 06430.

Emerson C-2002 Cartridge Includes 600 Feet of Tape

SANTA ANA, Calif. – The Emerson Electric Co.'s C-2002 tape cartridge includes 600 feet of 1/2-in. tape, giving it over four times the capacity of competing cartridges, the firm claimed.

The cartridge can be operated from 15/16 in./sec to 240 in./sec with a maximum serial transfer rate of .72M bit/sec. Bit density is 3,200 bit/in. for each track.

The cartridge costs $45 from the firm at 3300 S. Standard St., 92702.

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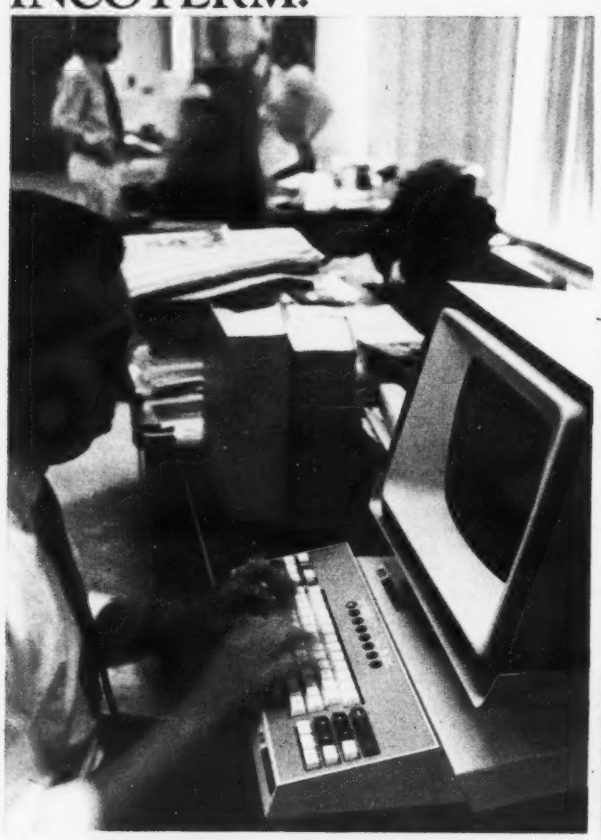

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COMPUTER INDUSTRY

CI Notes

Firms Tackle Standards

MINNEAPOLIS – Control Data Corp., Nixdorf Computer AG and The Plessey Co. Ltd. have formed an association to aid in the standardization of computer components.

The association will work through a new joint company, Standard Computer Komponenten GmbH (Stack GmbH), located in Frankfurt, W. Germany, formed for that purpose.

International Computers Ltd. said it will participate in Stack although it is not a shareholder.

"Joint work has already been proceeding for a year in the field of semiconductor memory components and it is foreseen that agreement on common performance requirements and on methods of test and quality control will ease the problems of suppliers in satisfying their several customers," explained Plessey's managing director, John D. Hayden.

In addition, the work should ensure "genuine alternative sources of supplies are available to the participants," he said.

STC Courts Ultimacc

LOUISVILLE, Colo. – Storage Technology Corp. (STC) has revealed its intention to acquire Ultimacc Systems, Inc., maker of integrated small business systems.

Ultimacc would be merged into a subsidiary of STC. The acquisition is subject to approval of a definitive agreement and approval of Ultimacc's shareholders.

HP Adds Training to 'Toads'

CUPERTINO, Calif. – Hewlett-Packard Co. has signed an agreement with Aries Corp., under which Aries will provide 10 days of on-site training to purchasers of HP's Terminal-Oriented Administrative Data Systems (Toads) packages.

The training program is covered in the price of Toads software, which is designed for educational institutions.

Interdata Lands Aussie Pact

OCEANPORT, N.J. – Interdata, Inc. has received an $8 million contract from the Australian Department of Defense for more than 70 Model 7/32 minicomputer systems.

Seven systems have been installed, and the rest will be delivered this year and next. The units will be used in a data communications network and for support of inventory control procedures for Australia's armed forces.

Supershort

Munzig International has been named the European representative for Data Disc, Inc. and its subsidiary, Bright Industries.

Vendors Assess Economy's Effects

Emphasis on Cost Effectiveness Helpful

By Nancy French
Of the CW Staff

PHILADELPHIA – Vendors specializing in software and small "alternative" systems and peripherals say the recession, with its accompanying emphasis on saving money and cost/performance, is helping rather than hurting their business.

Interviewed at the Computer Caravan here, John Maguire, president of Software AG, explained, "Adabas, a data base management package that costs $120,000, is the only product we sell.

"In a recession, people swallow on that price, and a few of our prospects are even holding off, especially manufacturers of luxury items such as luggage.

"Even so, we sold nine systems in February," he said. "We have 100 installed now and, at the rate we're going, we will have 200 installed in the next twelve months."

CW Inquiring Photographer

Edward Rivernider, sales representative for Prime Computer, said "business is booming. "We're not only making our quotas, we're exceeding them."

Edward Rivernider

The bulk of Prime sales is in communications and time-sharing, he noted, adding the demand for time-sharing is increasing.

"We're finding users are becoming more cost-conscious. When they find they can off-load some of their work onto smaller systems, they're doing it, especially now that there's more real software for minis," he continued.

"Either growth is being helped by the poor economy, or our growth is going to be greater when things turn around," James Blake, program manager for Cullinane Corp., said.

Bob Otten, Control Data Corp. senior account representative, said, "As a sales representative, I find the recession has helped CDC because people are looking at the economics of the data center. We offer media compatible with Honeywell, IBM and Burroughs, for example, at lower prices.

"Maybe they're not buying as much as we'd like, but they're buying what they need at the moment, and they're looking for good prices," he explained.

David Flanders of Software International also finds the packaged software business "has been enhanced by the economic problems. People want to control costs, and they can do it with packages," he said. "Many Fortune 500 companies are buying our packages to replace systems designed in-house that no longer fill

(Continued on Page 34)

U.S. DP Interests Represented In Upcoming Geneva Trade Talks

By Nancy French
Of the CW Staff

WASHINGTON, D.C. – The upcoming multilateral trade negotiations in Geneva will give members of the U.S. computer industry an unprecedented opportunity to help shape trade policy through participation in two high-level industry advisory committees.

Increasing international trade, especially high-technology exports, has become acutely important to the U.S. to help correct the current recession and to rectify the nation's lopsided balance of payments.

More than 100 nations will participate in the trade negotiations. Two DP industry leaders have been asked to aid negotiators through service on the exclusive Industry Policy Advisory Committee, composed of 19 chief executive officers of U.S. companies and chaired by the Secretary of Commerce.

Policy Advice

David Packard, a cofounder and chairman of the board, Hewlett-Packard Corp., and James H. Binger, chairman of the executive committee of the board of directors, Honeywell Corp., will provide U.S. negotiators continuing policy advice on the computer industry's objectives in the negotiations. The committee will meet throughout the course of the five-year negotiations.

Negotiating posture will be based on input from industry sector advisory committees (Isac).

Twenty-five computer industry international specialists serving on an Isac for office and computing equipment will provide detailed industry views on trade barriers affecting individual products. The committee is chaired by Oliver R. Smoot Jr. of the Computer and Business Equipment Manufacturers Association (Cbema).

In addition, they have been asked to submit views on such topics as U.S. industry status and outlook and comment on the supporting information on trade negotiation subject areas developed by the Commerce Department's research staff.

Under status and outlook, the negotiators are looking for industry opinions on domestic production, employment and other related factors and industry assessment of the principal foreign markets.

They also will want to know what countries are seen as principal foreign competitors as well as how trade decisions will affect U.S. subsidiaries overseas.

Committee members will also be asked to comment on the Commerce Department's interpretation of what foreign tariff concessions should be sought or negotiated, what U.S. concessions could be made to increase U.S. competitiveness and where concessions could be negotiated across sector lines.

DEC Touts Patented Interface

MAYNARD, Mass. – Digital Equipment Corp. has notified some suppliers of interfaces for add-on peripherals and memories to the PDP-11 that it holds a patent covering the interface linking to the Unibus.

DEC, in a letter mailed to a number of firms known to sell add-on equipment to the PDP-11, indicated it is willing to license this technology for a price of $50 for each device selling for under $2,500 and $100 each for devices exceeding $2,500.

The firm also sells an interface module, which carries with it an implied license, explained patent counsel Thomas Siekman.

DEC expects to receive "some income," from this action, he said, and anticipates the move will avoid any controversy by offering independent interface suppliers alternatives.

The crucial point of the patent is the interface, he said, although it also "broadly recites a peripheral containing all these elements, which are in the interface."

When asked what would happen if DEC found a firm to be in violation of its

(Continued on Page 34)

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Emphasis on Cost Effectiveness

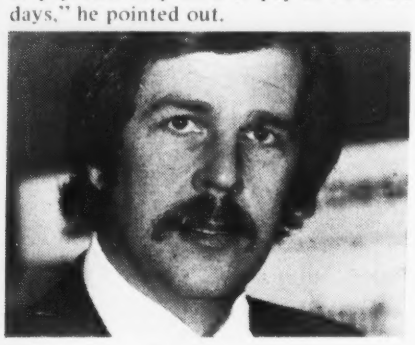
(Continued from Page 33)

their needs," he said.

'Becoming Bankers'

"Sales are up but revenues are down," Kent Padgam of NCR Corp. remarked, "because companies like NCR are becoming bankers.

"Customers are taking 90 to 120 days to pay bills they used to pay in 30 to 60 days," he pointed out.



Dan Roberts

That problem aside, "NCR has been aided by the business slump because people are looking for more ways to save money," he said. "DP people are more experienced now – they are more interested in price/performance than in service," he said.

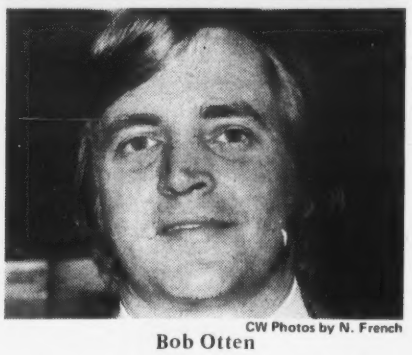
Richard Casterline, Sycor, Inc.'s eastern regional sales manager, said the recession has not affected Sycor's customers uniformly. "Business has been good," Casterline said, noting that Sycor has been "concentrating its marketing efforts in areas least affected by the recession," such as the oil industry and petrochemicals and minimizing its efforts in such consumer areas as textiles and transportation.

"We're forecasting a 15% increase this year, compared to 33% last year," he said.

IBM Users Looking at Alternatives

Gino Toigo, sales representative for Lockheed Electronics Co., Inc., observed, "people who are currently leasing or renting IBM System 3 model 6 or model 10 are beginning to look at us because we can do the same job as their present system for less money."

Gino Toigo



Bob Otten

CW Photos by N. French

"We offer the basic RPG compiler, and our dealers provide software support on a turnkey basis," he explained.

In previous years, "a guy wasn't too interested in an alternative system that could save him $200- to $300/mo, but now, if he can save even $100/mo he's beginning to think it's worth a change in equipment," he said.

Dan Roberts, Interdata, Inc.'s district manager, said that while the company has experienced a slight downturn over the past three months, it noted an upturn in business last month. "People are beginning to close a little quicker," he said. "I think the recession has bottomed out in our business," he explained.

DEC Touts Patented Interface

(Continued from Page 33)

patent, Siekman said, "we haven't crossed that bridge yet."

Standard royalty rates under a patent usually average 5%, and, in the worst instance with the PDP-11, DEC is charging 4%, so "we're low," he said.

Siekman acknowledged it is possible a firm could offer an interface for the PDP-11 Unibus that does not infringe on DEC's patent.

"It may be that no one out there really needs or wants a license," he said. "I doubt if that's the case, but it's a possibility."

No Negative Reaction Yet

Reaction from the industry, according to Siekman, has been for the most part positive. Some have been confused, but there's been no negative reaction yet, he said. Others have requested a copy of the patent.

Industry representatives contacted by *Computerworld* were confused or not terribly concerned.

Some expressed concern the move would deter users from going to independents for their add-on products. "Potential customers are asking if they should be afraid of buying from us," said one supplier of add-on products. However, he sees no long-term effects. "It's really a matter of DEC customers understanding what, if anything, the letter means," he added.

DEC probably made the move to "ward off attack on its memory products," he observed.

But a spokesman for a manufacturer that makes add-on memories for the PDP-11 said his firm has not received a letter from DEC. "If this is for real, we'll find out more," he said.

Meantime, the firm is attempting to determine whether there is any substance to DEC's claims, noting that when "people marry to the Unibus they're not duplicating . . ."

One industry spokesman suggested that if DEC decided to pursue the matter and took on any one firm for violating its interface patent, it might find itself with a class-action suit on its hands.

Contracts

Memorex Corp. has received a supply, installation and maintenance contract valued at more than $600,000 from the Association of American Railroads for 3670 disk storage subsystems and related equipment.

Brandon Applied Systems, Inc. has received a contract from the Illinois Department of Public Aid for the conversion of 141 programs to Cobol from Autocoder. The programs are running on an IBM 370/158 in 1401 emulation mode.

Stansaab Elektronik AB has received a contract valued at $1.8 million from Scandinavian Airlines to supply 400 Alfascope video-display terminals for the airline's computer-based reservations system.

Sanders Associates, Inc. has received a $280,000 contract from Grumman Aerospace Corp. to supply computer-driven graphic display systems for use as instructors' consoles for the U.S. Navy's A-6E aircraft weapons trainer system.

IBM Canada Ltd. has won part of an estimated $16 million contract to supply the Ontario Ministry of Government Services with equipment for use in government computer centers.

Computer Professionals Unlimited, Inc. has signed a three-year, $5 million contract with the Michigan Credit Union League to provide DP services to credit unions in Michigan.

Incoterm Corp. has received a contract from United Airlines to supply SPD 20/20 intelligent terminals for use in its on-line reservations system.

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Pertec Expects Disk Business to Double Again in '75

By Molly Upton
Of the CW Staff

CHATSWORTH, Calif. – Pertec Corp.'s disk business will again double in fiscal 1975, repeating a feat achieved in 1974, predicted Ralph Gabai, vice-president of marketing for the Peripheral Products Division.

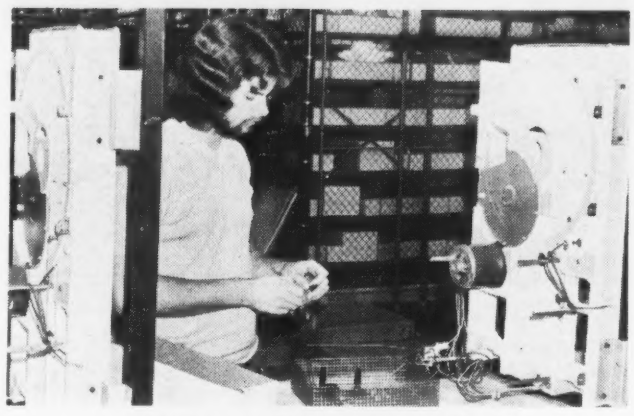
With the overall disk market projected to grow 25% to 35% this year, Pertec holds 10% to 13% of the 20M-byte and under cartridge disk drive market, he said.

Tape, which is a more mature market, will probably grow at a 5% to 10% rate, he noted.

The key challenge facing mini peripherals makers is bringing unit costs down to levels more commensurate with the price of mini processors, he said.

Noting mini prices have been reduced sharply recently through advances in electronics, he lamented the fact that electromechanical peripherals' costs are not as flexible since they are more vulnerable to raw materials and labor costs, which have been rising.

Gabai said he doesn't see tape being affected by any new technology. "The media is inexpensive and the drives reliable," he said.



Mark Rose assembles D3000 disk drive.

CW Photos by M. Upton

Gary Ross, test technician, checks out disk drives.

CCDs and Bubbles

Charge-coupled devices (CCD) and bubbles, however, have the potential to impact the disk market, although Gabai said he doubts they will make a dent before 1980.

If they have an opportunity, especially CCDs, it will be in replacing the head-per-track devices, a market Pertec is not in, he said.

CCD's power consumption problems remain to be solved, he noted.

CCDs will find a role in some kind of hierarchical memory system, somewhere between main semiconductor memory and moving-head disk, Gabai said.

But before the advent of CCDs and bubbles, he expects substantial increases in bit/sq-in. density, which will help bring down the cost per bit. This will result in larger capacity files, using existing proven technology in different forms to meet the needs of the mini market, he said.

More specifically, he cited using the concept of the Winchester technology and IBM 3330-type disk to create larger files at lower cost per unit instead of simply lower cost per bit.

Gabai distinguished between cost per bit and cost per unit. In the market, he said, the customer is looking at the bottom line of the unit cost.

Mini Fallout

There is likely to be some fallout in the mini peripherals market in the next two years, he said. Now there are 10 or 12 disk makers, whereas in the past about four firms have held 80% of the market, with two firms probably holding 70% of the tape market.

That leaves many companies each grappling with about 2% of the market," and these firms are going to have a hard time, he said.

Ralph Gabai

With minicomputer makers turning to in-house manufacture of peripherals, if these other firms haven't increased their market share by now, they will find it even more difficult in the future, he said.

A one-product electronics firm with 6% of the market will have difficulty, whereas in a consumer business that market share should prove to be a very viable business, Gabai said.

Gabai likened the current minimakers' move to vertical integration to the trend among large mainframers in the early '60s. At that time, the big mainframers bought their peripherals outside, and later many of them started manufacturing them.

But now, he said, they have returned to buying gear from outsiders. They looked at IBM's huge R&D budget and realized they cannot afford to conduct development on a wide variety of peripherals as well as processor technology, he explained.

Although minimakers are currently manufacturing more gear themselves, they will eventually look at the large R&D budgets of Digital Equipment Corp. and realize they can't afford to compete, to spend funds developing a product that could soon become obsolete, he predicted.

"The cost of membership in the peripherals area in many respects is as expensive as in the mainframe area," he said.

Pertec's disk products range in size from 2.5M bytes to 20M bytes and use a high degree – 80% – of commonality of parts, which helps cut costs. In addition, customers know increased capacity is available from the same source, Gabai said.

Pertec delayed its entry into the floppy disk market a year in order to tool up for totally integrated manufacture. It makes its own motors and heads, since every part bought outside represents a significant percentage of the ticket price, he said.

Pertec's dual-density floppy received a considerable boost when IBM brought out the System/32, which has no tape drive. All medium interchange and file updates are done with the floppy, he noted.

Head and media wear are critical in floppies, he said, adding Pertec is the only company in full production of ferrite heads.

Orders & Installations

Data Corp. of America, a service bureau, has ordered five NCR Century 101s for its processing centers.

Litton Industries, Inc. has ordered the MS-5, a corporate message-switching system, from Interdata, Inc. The system will be used to link more than 200 Litton facilities in a data communications network.

Datum, Inc. has installed a 5091 magnetic tape control system at Jet Propulsion Laboratory's Mission Test Computing Facility.

Star Graphic Systems, Inc. will install its first Star/Xylogics CPS/500 system at the *Newark Advocate*, where it will handle typesetting production.

Dillard's Department Store has installed its second IBM 3650 retail store system in its Lubbock, Texas store. The system includes 44 point-of-sale (POS) terminals with hand-held wands.

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Canadian DPers May Refuse Sales to the Government

By Gordon D. Hutchison
Special to Computerworld

OTTAWA – Representatives recently revealed here the Canadian computer industry is sufficiently opposed to a new set of terms issued by the federal government that they may collectively refuse to sell to the government.

The Department of Supply and Services began developing a new general-purchasing document for DP equipment three years ago and, after more than 30 meetings with industry representatives, a draft was agreed upon and forwarded to the management of the agency.

The document, issued last December and effective last Jan. 1, bore little resemblance to that agreed upon by the vendors, they said.

DP suppliers are particularly unhappy about the lack of provision for limiting liability.

The present version of document 9020A is completely silent on liability and gives the minister of supply and services the option to determine when and where a liability occurred.

The total Canadian market for DP equipment is estimated at $500 million, with the federal government's share worth about $75 million.

Industry representatives have said privately they are prepared to withhold sales to the government, thus sacrificing up to one-sixth of their business in order to sell on terms they believe to be reasonable.

They are already preparing contingency plans to avoid federal government sales.

Continue to Bid

Suppliers have continued to bid on government tenders since the first of the year, but have exempted their bids from the provisions of 9020A.

Some have simply substituted document 1026 – the general terms and conditions document in effect prior to Jan. 1 – or have provided substitute clauses for the objectionable clauses in 9020A.

The government is negotiating important contracts on a case-by-case basis.

Computer industry representatives here have said they want to avoid a confrontation, but are prepared to back up their position by withholding sales.

If the government remains stubborn, they added, prices on major systems could rise dramatically, if products are offered for sale at all.

International News

U.S. Vendors to Exhibit in Italy

MILAN, Italy – The U.S. Commerce Department will spotlight minicomputers, terminals and peripherals at an exhibit July 3-7 at the U.S. Trade Center here.

Space is available to new-to-market companies at the previous $600 base fee and to established exporters at a $900 base fee.

After July 1, U.S. firms who participate in such exhibits will be asked to pay a new set of fees, according to a Commerce Department spokesman. The new fee schedule will be announced soon, he said.

New-to-market companies will not be affected by fee changes.

In line with overall budget cuts, Commerce will discontinue subsidizing old-to-market exporters at such exhibitions.

The show will feature business-oriented equipment for accounting, administration and related operations as well as equipment for data handling, process control, laboratory applications, traffic control, transportation control, typesetting and radio and television operation.

Trade outlook studies by the Commerce Department showed, despite a downturn in the Italian economy, U.S. exports to Italy are expected to increase this year, particularly in high-technology equipment.

Market research was bolstered by the success of Commerce Department-sponsored exhibitions of computers at the Milan Trade Center last year and in 1973. Fifty-nine exhibitors at a data and telecommunications equipment show in May 1974 reported floor sales of $600,000 and forecasted additional sales of $15.8 million in 12 months as a result of the exhibit.

Following an exhibit of minicomputers, terminals and peripherals last May, the 61 participating companies reported total sales of $9 million.

The Bureau of International Commerce, U.S. Department of Commerce, Washington, D.C. 20230 can provide information.

Russian Trade Loss Cuts Foreign Orders

WASHINGTON, D.C. – U.S. companies have lost many foreign orders as a result of the breakdown in trade negotiations between the U.S. and the Soviet Union, the Soviet deputy foreign trade minister said in a recent news conference here.

At the conference, held jointly by Vladimir S. Alkhimov and Pepsico Chairman Donald M. Kendall, the two called for a revision of the legislation the Soviet Union rejected.

That act tied freer American trade and new U.S. government trade credits to liberalization of Soviet emigration policy and the Soviet settlement of its World War II lend-lease debt to the U.S.

As a result, the Soviet Union canceled the 1972 trade agreement with the U.S.

Kendall said that, without credit restrictions, $2 billion in U.S. government credits for the Soviet Union could finance $6 billion worth of Soviet business in this country, creating 240,000 jobs.

"This is probably the cheapest form of job generation you can get," Kendall said.

"While this country is sitting on the sidelines . . . Western Europe and Japan are going to get the jobs," Kendall said.

Without the 1972 trade agreement, the Soviet Union receives no new Export-Import Bank credit, a crucial element in the trade with that nation.

By comparison, the Soviets have been granted credits of nearly $8 billion from France, West Germany, Britain, Italy and Japan.

The Soviet Union is now "finalizing our five-year plan," he said, implying that now is the time to act.

"Some people think we cannot live without your trade," Alkhimov said, but "trade is not a gift" and "credit also is not a gift . . . you pay with interest."

Alkhimov indicated emigration was not negotiable – at least at this time.

"If we start again on this problem, we shall never finish," he said.

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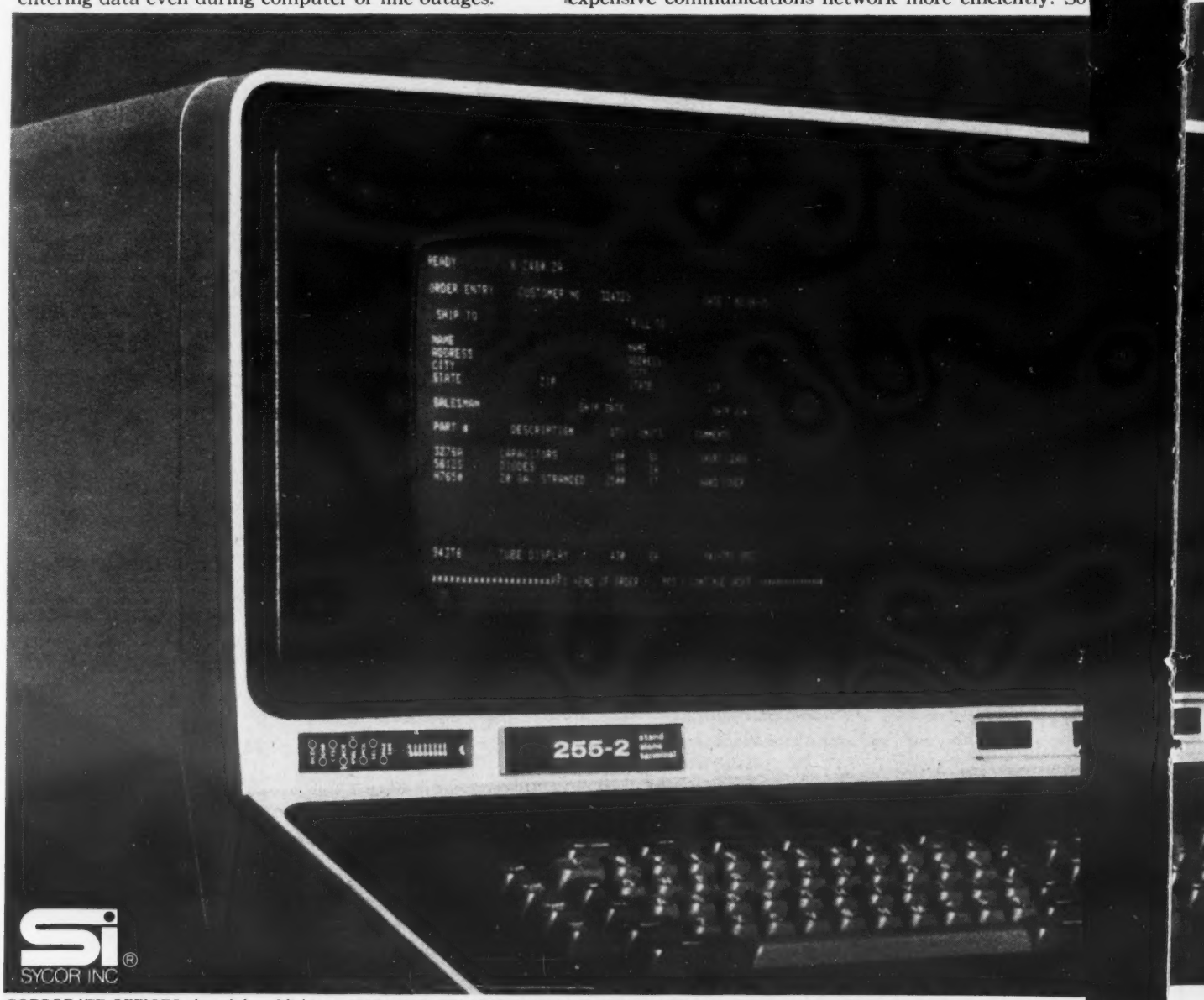

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Airline's Order Still Up in the Air

LONDON – Sperry Univac's contract with the Soviet airline, Aeroflot, calling for a $10 million passenger reservation system, is caught between the proverbial rock and a hard place.

A year has passed since the company applied for a U.S. export license to ship the system. Since then, the Soviet government canceled its 1972 trade agreement and Congress passed two pieces of trade legislation that have increased rather than reduced the length of time needed to obtain an export license by routing every application through the Department of Defense (DOD).

Only 5% of the applications for export licenses made since last year's trade bills were passed have been processed, a Commerce Department spokesman said.

Canceling the trade agreement also nullified the U.S. offer of credit that would have allowed the Soviets to borrow money at lower than the commercial rate to purchase American-made goods. As a result, some observers are speculating Aeroflot may buy its computerized reservation system elsewhere.

One who made such a remark here recently was Sperry Board Chairman J. Paul Lyet.

Attributing the opinion to the company's legal department, Lyet said he thought cancellation of the trade agreement automatically invalidated all agreements between American companies and the Soviets.

More than $40 million in additional business is riding on the success of this first contract, according to Lyet, and if Univac doesn't get the intial order he fears the business would be lost "to a European company."

The Soviet Union has been granted credits of nearly $8 billion from France, West Germany, Britain, Italy and Japan, according to a Commerce Department spokesman.

DOD License Backlog Delaying DP Shipments to Eastern Bloc

By Nancy French
Of the CW Staff

WASHINGTON, D.C. – An amendment to the Export Administration Act which requires Department of Defense (DOD) review of everything from synthetic chemicals to computer systems bound for an Eastern Bloc country is contributing to the delays DP firms are experiencing in getting validated export licenses.

While the legislation passed last fall granted the DOD power to ease the paperwork burden by determining in advance what categories of goods they did not wish to review, no action has yet been taken on that option.

Instead, the DOD's Office of Strategic Trade and Disclosure is coping with the paperwork by expanding its one-man staff. One new full-time employee and two temporary employees have been hired, and it is presently recruiting another full-time staff member.

A DOD spokesman, caught between zealous legislators and DOD inaction, would say only, "We're complying with the law."

During the last quarter of 1974, when the law became effective, the office that previously reviewed only sensitive export applications reviewed 912 cases. Of that number, 96 were considered "sensitive" or capable of "significantly increasing the military capability" of the nation to which the item was to have been sent.

According to the spokesman, 725 cases were reviewed that would not have been sent to the DOD prior to the new legislative requirement.

Under previous trade policy, barely half that number of license applications would have been sent to the Office of Strategic Trade and Disclosure, according to the statistics gathered by Robert Spruell, chief of the Program Services Branch in the Office of Export Administration.

In defending congressional action on license review, Stanley Marcus, a legislative assistant to Sen. Adlai Stevenson III, said "the problem arises because the Defense Department has taken on this role without regard to the flexibility granted by the legislation to delegate back to the Commerce Department the categories of goods they did not wish to review.

"It has not taken that action, so it now gets all license applications for Eastern Bloc countries. The office is understaffed; it can't do it. It wasn't intended to," he said.

Different Procedures

At the present time, all goods exported from the United States must receive some type of export license from the Department of Commerce's Office of Export Administration. About 60,000 applications for export licenses were received last year.

Exports designated for free world countries receive quick approval from Commerce and a general license after officials there have determined such exports are appropriate for their stated end use and the company to which the products are being sent is not likely to ship them on to a Communist country.

For Eastern Bloc countries, however, the procedure is quite different.

When a license is requested to export an American-made product to such a country, the Office of Export Administration first makes "a technical evaluation" of the commodity, and looks at the proposed end user to assure it is a civilian organization, according to Dan Cook of the Office of Export Administration.

The license application is then sent to the Interagency Operating Committee or the Interagency Committee on Strategic Trade and Disclosure at DOD, where it gets caught in the bottleneck. Here, when the tiny staff gets to it, it is reviewed again and, if necessary, sent on to be reviewed by the Office of Munitions Control, the Atomic Energy Commission or any other agency reviewers think might be appropriate. It might even be sent on to the coordinating committee of the Nato countries.

A license application could get delayed in any of these places, Cook said. However, if the delay is longer than 90 days, the shipper is notified.

On sensitive items, such as computer systems, the various committees may decide to approve part of the order or approve it with some limitations, such as "cutting down the number of peripherals, or reducing the number of tape drives," he explained.

International News

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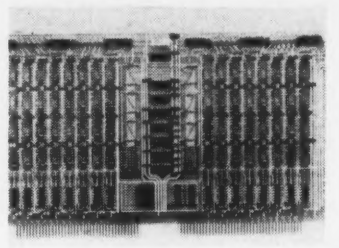
Intel Marketing CCDs Commercially

SANTA CLARA, Calif. – Intel Corp. has brought the charge-coupled device (CCD) out of the laboratory and is producing, as a standard commercial product, a 16K CCD known as the 2416 CCD Serial Memory.

The single silicon chip in a standard 18-pin memory circuit package is less than one inch long, has an array of 64 shift registers (each 256 bits long), and I/O control logic similar to a random-access memory (RAM) circuit.

Although the 2416 can be used as a replacement for registers in high-reliability and small serial memory designs, high-volume applications are expected to be bulk memory designs, such as drum-like memories, Intel said.



Intel 2416

has developed 1K dynamic MOS-LSI RAMs that are pin- and electrically compatible with Intel 1103A-type memories.

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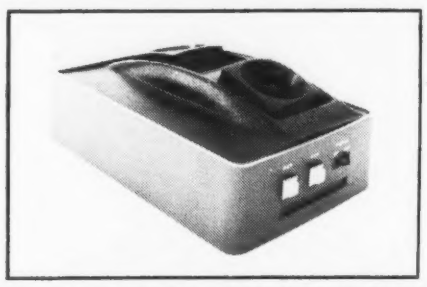

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PHOENIX, Arizona – The OMNITEC CORPORATION has announced the newest in its growing line of acoustic couplers and modems. The "Bawdy 12". Designed to interface with any 1200 baud time-sharing system and remain compatible with the Bell System 202CR. The intelligence of this unit becomes apparent, however, when in the automatic mode line control is established by the "Bawdy 12" itself. In this mode the "Bawdy 12" is slaved to the remote Bell 202CR. The receiver or transmit will always be opposite from that of the far end modem. Logic and timing are all internal. The only RS232 ports required are received data (BB) and transmitted data (BA). Signals: Request to send (Ckt CA), Data Terminal Ready (Ckt CD), Supervisory Transmitted Data (Ckt SA), may be applied, but will be ignored by the "Bawdy 12" if they are not appropriate. The "Bawdy 12" is presently available for evaluation by contacting your Omnitec representative and is available for purchase in quantities 1-9 at $985.00. Delivery is 4-6 weeks ARO.

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One Intel-built system with 1M bit/circuit card has an access time less than 200 μsec and reads or writes faster than 64M bit/sec.

The 2416 is available in 18-pin plastic and 22-pin ceramic packages.

Prices for 25 to 99 units range from $62.50 for the 18-pin to $65 for the 22-pin from the firm at 3065 Bowers Ave., 95051.

CMI DOT Nonvolatile

BEDFORD, Mass. – Cambridge Memories, Inc.'s (CMI) Microstor uses Domain Tip (DOT) thin-film storage elements to provide a nonvolatile backup memory for microprocessor and other products that use semiconductor or control memory.

Suitable also for other applications requiring low capacity and moderate access speeds, such as point-of-sale terminals, the Microstor units range from 4K by 12 bits to 32K by 12 bits in multiple module configurations.

An 8K by 12 bit with read/write capability and supporting electronics is available on one printed circuit card.

Microstor can search randomly through each block of data.

Price per bit is about 40% below core costs, the firm said. An 8K by 12 bit system is priced at $395 in OEM quantities. Initial deliveries begin in June, with shipments in 30 days from 12 Crosby Drive, 01730.

Calcomp Floppy Formatter Handles Up to Four Drives

ANAHEIM, Calif. – California Computer Products, Inc.'s (Calcomp) 1140 floppy disk drive formatter is a microprocessor-controlled subsystem designed to control up to four Calcomp 140 floppy disk drives.

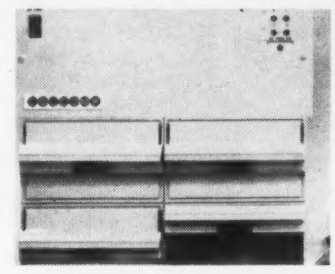
Storage capacity is over 1.6M bytes (unformatted) and over 970K bytes (in IBM 3740 format). Transfer rate is 31,250 byte/sec, and access time for each drive is 6 msec track to track, the firm said.

The 1140 electronics are available separately at $1,100 in OEM quantities and 1 by 2 systems cost about $2,500 in OEM quantities from 2411 West La Palma Ave., 92801.

National Unveils 4K Prom

SANTA CLARA, Calif. – A 4K programmable read-only memory (Prom) from National Semiconductor Corp., the Model MM5204, has been developed for use in peripherals, terminals, communications and microprocessors.

The static, nonvolatile memory is organized into 512 words of 8 bits each and is erasable as well as compatible with bipolar



Calcomp 1140 Formatter

logic devices, National said.

Access time is 750 nsec and the unit price is $50 in lots of 100. Delivery takes about four weeks from 2900 Semiconductor Drive, 95051.

Other New OEM Products

Control Data Corp.'s 94200 core memory module offers expansion in increments of 65K bytes on a single card. The basic unit is a 16K by 36 bit module with an access time of 350 nsec.

Prices range from $2,175 for single units to $1,975 in quantities. Sizes of 32K by 18 bits and 16K by 18 bits are available from CDC at 3857 Louisiana Ave., St. Louis Park, Minn. 55435.

– – –

Synertek's SY1103A-X is a high-speed version of the firm's SY1103A-1, which is provided as a second source for Intel's 1103A.

The Synertek chip, also a 1K bit MOS RAM, features reduced capacitance and does not require the Precharge clock.

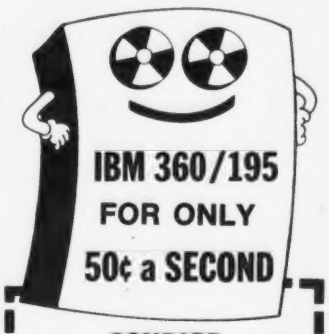
The SY1103A-X costs $12.50 in quantities of 100 to 999 from 3050 Coronado Drive, Santa Clara, Calif. 95051.

– – –

Intel's In-26 memory, available in increments of 4K by 10, is a one-board system requiring -5 V. It is available in system speeds of 350-, 475-, 600- and 900 nsec and needs one connector for interfacing, the firm said.

Pricing, depending on speed required, can be below 1 cent/bit in OEM quantities from 1302 N. Mathilda Ave., Sunnyvale, Calif. 94086.

Rockwell International Corp.



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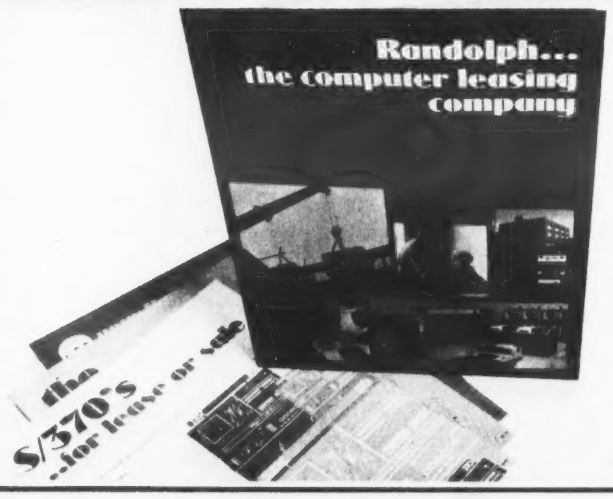

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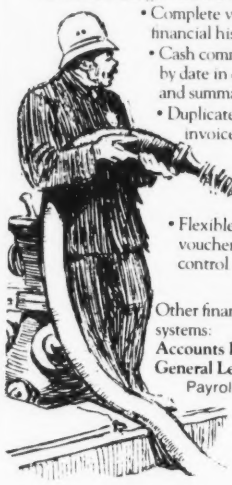

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Potter Announces Recapitalization Plan

PLAINVIEW, N.Y. – In an effort to ward off bankruptcy, Potter Instrument Co., Inc.'s board of directors has approved a plan of recapitalization and also a seven-year management consulting agreement with Potomac Federal Consultants, Inc.

For the year ended June 30, Potter incurred a loss of $11.4 million or $4.14 a share compared with a loss of $2.3 million or 83 cents a share for 1973.

Revenue rose to $49.4 million from $47.4 million last year.

Since June, Potter has continued to incur losses and lacks adequate working capital to continue operations, is in default in payment of various obligations including trade payables, a principal payment of $1.5 million under its outstanding term loans and an arbitration award of about $1.3 million, the firm said.

During 1974, there was a $5.2 million provision for write-down of inventory, a $1.7 million reduction of lease base carrying values, $761,000 in write-down of doubtful accounts and $467,000 charge for directors' deferred compensation. On the positive side, the firm received $1.8 million in income from settlement of litigation.

The recapitalization plan provides for a recasting of about $20.1 million in existing indebtedness into about $11.6 million in preferred stock with a mandatory redemption schedule and $8.5 million in debt, together with 10-year warrants to purchase 200,000 shares of Potter common at 25 cents a share.

In consideration for a loan of about $3 million from Potomac Federal Consultants, Inc. and others, the plan provides for issuance of 10-year warrants to purchase 4.1 million shares of common at 25 cents a share.

The plan further provides for issuance of warrants to purchase up to 200,000 shares of common as part of a management incentive plan.

The recapitalization plan is subject to approval by Potter stockholders and is contingent upon the cooperation and approval of creditors including agreement to a stretch-out payment plan for trade and other unsecured creditors.

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Itel Reports Revenues, Earnings For 12 Months at All-Time High

SAN FRANCISCO – Itel Corp. posted record revenues and earnings for 1974.

Earnings reached $9.7 million or $1.07 a share compared with $5.6 million or 70 cents a share last year, when there was a $4.7 million charge and $2.1 million in tax credits.

The charge resulted from the adjustment of the IBM 360 portfolio less the gain on the sale of Information Storage Systems, Inc. Tax benefits arose from discontinuing its office products operation in 1971.

Revenues rose to $143.5 million from $108.5 million in 1973.

All areas of the firm contributed to earnings, said a spokesman, and only the Leasing Division's results were down from those of 1973.

Demand in data products and services appears stronger than last year at this time, said President Peter S. Redfield.

But its container leasing business has experienced a reduction in its fleet utilization, and the Financial Services Group started the year with a slightly lower backlog of transaction awards than at the beginning of 1974, he added.

Itel's discontinuance of its IBM 360 leasing business and payments related to the sale in 1973 of information storage systems are proceeding on schedule, so the qualifications contained in the 1973 auditor's report will be removed, the firm said.

Record Year Reported at Data 100

MINNEAPOLIS, Minn. – Data 100 Corp., maker of remote batch terminals, completed a record year and fourth quarter ended Dec. 31.

Revenues rose 63%, shipments 31% and income from operations, before financing and tax charges, was up 80%.

For the year, revenues totaled $69.7 million compared with $42.7 million last year. Earnings, including a tax credit of $1.8 million, totaled $4.8 million or 85 cents a share compared with $3.4 million or 61 cents a share last year, when there was a $1.4 million tax credit.

During the quarter, revenues rose to $21.6 million from $14.6 million in 1973. Earnings reached $1.6 million or 29 cents a share compared with $1.1 million or 22 cents a share in the same 1973 period.

Tax credits were $1.2 million in the 1974 period and $802,000 in the same quarter last year.

Interest Costs Doubled

The increases in earnings were accomplished despite interest costs that more than doubled since 1973, noted President Edward D. Orenstein.

During 1974, Data 100 shipped 1,440 large batch computer terminal systems, a 31% increase over 1973, he explained.

The firm's pool of equipment on lease continued to build. Revenues from that lease base grew 72%, he said, and at year end that lease base generated about $3 million a month in revenue, he said.

Sales income increased 145% to $25.2 million from $10.3 million in 1973. This includes outright purchases of equipment, lease-to-sales conversions and long-term leases accounted for as sales.

Sykes Results Down From 1973

ROCHESTER, N.Y. – A dip in Sykes Datatronics, Inc.'s third-quarter earnings brought nine-month earnings to $102,973 compared with $112,510 in the year-ago period.

Revenues during the nine months rose to $2.4 million from $2.2 million.

During the third quarter, unusually large shipments of cassette drives to one customer resulted in a decrease in income despite a slight sales increase because of volume discounts, explained Chairman Robert F. Sykes.

The sale assisted the firm in its inventory-reduction program and further strengthened its cash position, he added.

Third-quarter revenues totaled $863,000 compared with $811,000, while earnings dipped to $27,000 compared with $46,000 in the year-ago period.

Productivity continues to increase, Sykes said.

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Earnings Reports

INSTRUMENT SYSTEMS
Three Months Ended Dec. 31

	1974	1973
Shr Ernd	$.04	$.08
Revenue	49,411,000	53,248,000
Spec Cred	50,000	241,000
Earnings	382,000	809,000

MEMOREX
Year Ended Dec. 31

	1974 (000)	1973 (000)
Revenue	$217,627	$176,923
Loss	8,972	119,090

COMPUTER INVESTORS GROUP
Nine Months Ended Dec. 31

	1974	1973
Shr Ernd	.....	$.18
Revenue	22,174,962	15,792,987
Earnings	(912,966)	384,696

STORAGE TECHNOLOGY
Year Ended Dec. 27

	1974	1973
Shr Ernd	$1.45	$1.70
Revenue	75,314,000	56,596,000
Tax Cred	.....	1,600,000
Earnings	5,269,000	5,982,000

OPTICAL SCANNING
Three Months Ended Dec. 31

	1974	1973
Shr Ernd	.....	$.18
Revenue	$4,015,454	5,090,949
Tax Cred	.....	56,600
Earnings	(104,081)	118,942
6 Mo Shr	.....	.23
Revenue	8,453,111	9,376,168
Tax Cred	.....	66,600
Earnings	(168,665)	150,147

AMPEX
Three Months Ended Jan. 25

	1975	1974
Shr Ernd	$.14	$.20
Revenue	63,344,000	66,683,000
Tax Cred	645,000	840,000
Earnings	1,487,000	2,183,000
9 Mo Shr	1.49	.38
Revenue	191,199,000	195,571,000
Tax Cred	6,811,000	1,330,000
Earnings	16,184,000	4,108,000

DATAPOINT
Three Months Ended Jan. 31

	1975	1974
Shr Ernd	$.53	$.39
Revenue	10,839,000	7,817,000
Tax Cred	390,000	224,000
Earnings	1,095,000	767,000
6 Mo Shr	.98	.77
Revenue	20,913,000	14,654,000
Tax Cred	639,000	489,000
Earnings	1,993,000	1,525,000

FABRITEK
Three Months Ended Dec. 27

	1974	a1973
Shr Ernd	.....	$.33
Revenue	$8,085,000	12,046,000
Tax Cred	.....	319,000
Earnings	(557,000)	1,092,000
9 Mo Shr	.....	.64
Revenue	27,075,000	28,337,000
Tax Cred	.....	830,000
Earnings	(119,000)	2,103,000

a-Restated.

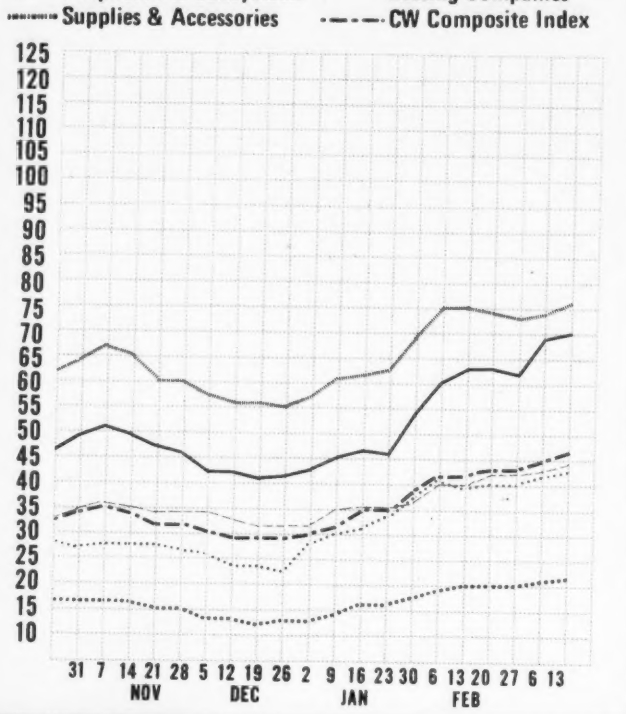
DATATAB
Year Ended Dec. 31

	1974	1973
Shr Ernd	$.20	.....
Revenue	5,245,408	$5,085,705
Earnings	151,574	(23,325)

HEWLETT-PACKARD
Three Months Ended Jan. 31

	1975	1974
Shr Ernd	$.67	$.54
Revenue	212,019,000	189,168,000
Earnings	18,413,000	14,530,000

COMPUTERWORLD Computer Stocks Trading Indexes



Computerworld Sales Offices

Vice President — Marketing
Neal Wilder
Sales Administrator:
Dottie Travis
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800
Telex: USA-92-2529

Northern Regional Manager
Robert Ziegel
Account Manager
Mike Burman
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800
Telex: USA-92-2529

Eastern Regional Manager
Donald E. Fagan
Account Manager
Frank Gallo
COMPUTERWORLD
2125 Center Avenue
Fort Lee, N.J. 07024
Phone: (201) 461-2575

Los Angeles Area:
Bob Byrne
Robert Byrne & Assoc.
1541 Westwood Blvd.
Los Angeles, Calif. 90024
Phone: (213) 477-4208

San Francisco Area:
Bill Healey
Thompson/Healey Assoc.
1111 Hearst Bldg.
San Francisco, Calif. 94103
Phone: (415) 362-8547

Japan:
Ken Suzuki
General Manager
Dempa/Computerworld
1-11-15 Higashi Gotanda
Shinagawa-ku, Tokyo 141
Phone: (03) 445-6101
Telex: Japan-26792

United Kingdom:
Michael Young
c/o IDC Europa Ltd.
140-146 Camden Street
London NW1 9PF, England
Phone: (01) 485-2248
Telex: UK-26-47-37

West Germany:
Otmar Weber
Computerworld GmbH
(8) Muenchen 90
Tegernseer Landstrasse 300
West Germany
Phone: (089) 690-70-52
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TRADE*QUOTES

Computerworld Stock Trading Summary

All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		1974 RANGE (1)	CLOSE MAR 12 1975	WEEK NET CHNGE	WEEK PCT CHNGE
N	BURROUGHS CORP	62-109	89 3/8	-2	-2.1
O	COMPUTER AUTOMATION	2- 14	5 1/8	- 1/8	-2.3
N	CONTROL DATA CORP	10- 38	17	- 3/4	-4.2
N	DATA GENERAL CORP	10- 38	21 3/4	+2 3/8	+12.2
O	DATAPOINT CORP	5- 15	10 1/4	+ 1/2	+5.1
O	DIGITAL COMP CONTROL	1- 5	1 1/4	0	0.0
N	DIGITAL EQUIPMENT	46-121	79 3/4	-3 1/4	-3.9
N	ELECTRONIC ASSOC.	1- 3	2 3/8	- 1/8	-5.0
A	ELECTRONIC ENGINEER.	4- 11	6 7/8	+ 1/8	+1.8
N	FOXBORO	19- 48	29 1/8	+ 1/4	+0.8
O	GENERAL AUTOMATION	6- 40	7 3/4	+ 1/4	+3.3
O	GRI COMPUTER CORP	1- 2	1/4	0	0.0
N	HEWLETT-PACKARD CO	54- 90	87 3/4	+ 1/8	+0.1
N	HONEYWELL INC	18- 88	31 3/8	+1	+3.2
N	IBM	152-251	213	-6 1/4	-2.8
O	INTERDATA INC	8- 22	22 1/8	+2 1/8	+10.6
O	MEMOREX	2- 5	4 1/2	+ 7/8	+24.1
O	MICRODATA CORP	1- 5	2 1/4	- 1/4	-10.0
N	NCR	14- 40	23	-1 1/2	-6.1
N	RAYTHEON CO	21- 39	32 5/8	+1 3/8	+4.3
N	SPERRY RAND	24- 44	34 1/2	- 1/8	-0.3
A	SYSTEMS ENG. LABS	1- 3	2	0	0.0
O	ULTIMACC SYSTEMS INC	1- 2	3 3/4	+ 1/2	+15.3
N	VARIAN ASSOCIATES	6- 13	9 1/8	+ 1/4	+2.8
N	WANG LABS.	7- 20	9 3/4	- 3/4	-7.1
N	XEROX CORP	50-127	75 3/4	-2 5/8	-3.3

LEASING COMPANIES

EXCH		1974 RANGE (1)	CLOSE MAR 12 1975	WEEK NET CHNGE	WEEK PCT CHNGE
O	COMDISCO INC	1- 7	2	+ 1/4	+14.2
A	COMMERCE GROUP CORP	2- 6	3 3/8	- 1/8	-3.5
A	COMPUTER INVSTRS GRP	0- 4	1	0	0.0
M	DATRONIC RENTAL	1- 1	5/8	0	0.0
A	DCL INC	0- 1	3/8	0	0.0
N	DPF INC	2- 5	4 1/2	+ 1/2	+12.5
O	EDP RESOURCES	2- 3	2	0	0.0
A	GRANITE MGT	1- 3	2 3/4	+ 3/8	+15.7
A	GREYHOUND COMPUTER	2- 6	2 1/2	+ 3/8	+17.6
A	ITEL	3- 6	5 5/8	+ 3/8	+7.1
N	LEASCO CORP	5- 12	6 3/4	- 3/4	-10.0
O	LEASPAC CORP	0- 0	3/4	0	0.0
O	LECTRO MGT INC	1- 1	1/8	0	0.0
O	NRG INC	1- 5	2 1/4	- 1/8	-5.2
A	PIONEER TEX CORP	2- 10	2 3/8	0	0.0
A	ROCKWOOD COMPUTER	0- 1	1/2	- 1/8	-18.1
N	U.S. LEASING	5- 24	11 5/8	- 3/8	-3.1

SOFTWARE & EDP SERVICES

EXCH		1974 RANGE (1)	CLOSE MAR 12 1975	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 2	3/4	0	0.0
A	APPLIED DATA RES.	1- 3	1 5/8	- 1/8	-7.1
N	AUTOMATIC DATA PROC	21- 57	43 5/8	-2 3/4	-5.9
O	BRANDON APPLIED SYST	1- 1	1/4	0	0.0
O	CENTRAL DATA SYSTEMS	4- 6	3	0	0.0
O	COMPUTER DIMENSIONS	1- 3	2	0	0.0
O	COMP ELECTION SYSTMS	3- 4	3 3/4	- 1/4	-6.2
O	COMPUTER HORIZONS	1- 5	3/4	0	0.0
O	COMPUTER NETWORK	1- 2	1 1/4	0	0.0
N	COMPUTER SCIENCES	2- 4	3 3/4	+ 1/4	+7.1
O	COMPUTER TASK GROUP	1- 1	1/2	0	0.0
O	COMPUTER USAGE	2- 4	3 3/8	+ 1/2	+17.3
O	COMSHARE	2- 4	2 7/8	+ 1/8	+4.5
O	DATATAB	1- 3	1 1/8	0	0.0
A	ELECT COMP PROG	1- 1	1/4	0	0.0
N	ELECTRONIC DATA SYS.	11- 25	13 1/2	- 7/8	-6.0
O	INFONATIONAL INC	1- 2	1/8	0	0.0
O	IPS COMPUTER MARKET.	1- 1	3/8	0	0.0
O	KEANE ASSOCIATES	2- 4	1 3/4	0	0.0
O	KEYDATA CORP	1- 6	2 5/8	+ 1/4	+10.5
O	LOGICON	2- 5	3 3/4	0	0.0
A	MANAGEMENT DATA	1- 2	1 3/4	- 1/8	-6.6
O	NATIONAL CSS INC	5- 37	8	- 1/2	-5.8
O	NATIONAL COMPUTER CO	1- 1	1/4	0	0.0
A	ON LINE SYSTEMS INC	9- 30	9 1/4	- 1/8	-1.3
N	PLANNING RESEARCH	2- 4	3 7/8	+1	+34.7
O	PROGRAMMING & SYS	1- 1	5/8	0	0.0
O	RAPIDATA INC	1- 5	1 5/8	- 1/4	-13.3
O	SCIENTIFIC COMPUTERS	1- 1	1 1/8	0	0.0
O	SIMPLICITY COMPUTER	1- 1	1/4	0	0.0
O	TYMSHARE INC	6- 12	11 3/4	+ 5/8	+5.6
O	UNITED DATA CENTER	2- 4	2 7/8	0	0.0
A	URS SYSTEMS	2- 4	2 1/2	- 1/8	-4.7
N	WYLY CORP	1- 5	3 1/4	+ 1/2	+18.1

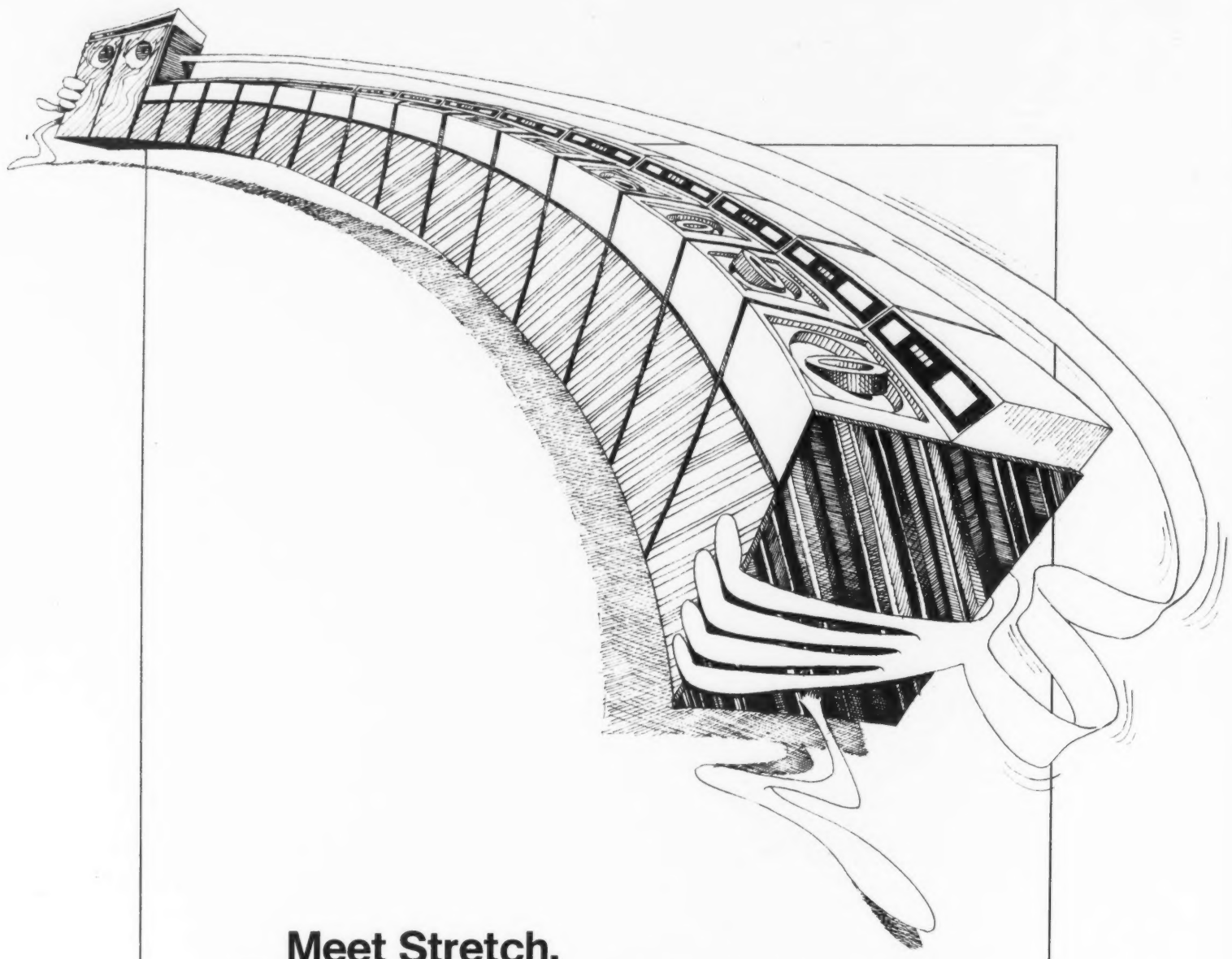
PERIPHERALS & SUBSYSTEMS

EXCH		1974 RANGE (1)	CLOSE MAR 12 1975	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	3- 11	7 1/2	+1 1/4	+20.0
O	ADVANCED MEMORY SYS	1- 7	3 1/2	+ 3/4	+27.2
N	AMPEX CORP	2- 5	4 5/8	+ 1/2	+12.1
O	ANDERSON JACOBSON	1- 4	1 3/4	- 1/8	-6.6
O	BEEHIVE MEDICAL ELEC	1- 7	2 1/4	+ 1/4	+12.5
A	BOLT,BERANEK & NEW	5- 9	5 7/8	+ 1/4	+4.4
N	BUNKER-RAMO	3- 8	6 3/4	+ 5/8	+10.2
A	CALCOMP	4- 11	6 3/4	+2 1/4	+50.0
O	CAMBRIDGE MEMORIES	3- 16	4	+ 3/4	+23.0
N	CENTRONICS DATA COMP	7- 23	13 3/8	- 1/4	-1.8
O	CODEX CORP	8- 27	25 3/4	+2	+8.4
O	COGNITRONICS	1- 2	1/2	+ 1/8	+33.3

SUPPLIES & ACCESSORIES

EXCH		1974 RANGE (1)	CLOSE MAR 12 1975	WEEK NET CHNGE	WEEK PCT CHNGE
O	COMPUTER COMMUN.	1- 2	3/8	- 1/8	-25.0
O	COMPUTER CONSOLES	2- 3	3	0	0.0
A	COMPUTER EQUIPMENT	1- 2	1 3/8	0	0.0
O	COMPUTER MACHINERY	1- 5	1 1/2	0	0.0
O	COMPUTER TRANSCEIVER	1- 2	1 1/8	- 1/8	-10.0
O	COMTEN	1- 5	3 1/8	+ 3/8	+13.6
N	COMPAC CORP	10- 22	17 1/8	-1 5/8	-8.6
O	DATA ACCESS SYSTEMS	2- 3	1 1/8	0	0.0
O	DATA 100	4- 13	10 3/8	+1 5/8	+18.5
A	DATA PRODUCTS CORP	2- 4	3 7/8	+ 7/8	+29.1
O	DATA TECHNOLOGY	1- 4	1 7/8	+ 1/4	+15.3
O	DATUM INC	1- 4	1 1/4	- 1/8	-9.0
O	DECISION DATA COMPUT	3- 13	5 3/4	+ 7/8	+17.9
O	DELTA DATA SYSTEMS	1- 2	1/2	+ 1/8	+33.3
O	DIZAK CONTROLS	1- 2	5/8	0	0.0
N	ELECTRONIC M & M	1- 4	2	+ 1/4	+14.2
O	FARRI-TEK	1- 3	7/8	0	0.0
O	GENERAL COMPUTER SYS	1- 4	1	- 1/4	-20.0
N	HAZELTINE CORP	2- 7	3 1/2	+ 1/4	+7.6
N	HARRIS CORP	13- 34	20 3/8	+ 5/8	+3.1
A	INCOTERM CORP	1- 6	2 7/8	- 1/8	-4.1
O	INFOREX INC	1- 5	3	+ 1/4	+9.0
O	INFORMATION INTL INC	6- 14	11 1/4	+ 1/4	+2.2
A	LUNDY ELECTRONICS	3- 3	2 7/8	0	0.0
O	MANAGEMENT ASSIST	1- 1	3/8	0	0.0
A	MTLGC ELECTRONICS	6- 19	11 3/8	-1	-8.0
N	MOHAWK DATA SCI	1- 4	2	+ 1/4	+14.2
O	ODEC COMPUTER SYST.	1- 3	3/4	0	0.0
O	OPTICAL SCANNING	2- 6	2	0	0.0
O	PERTEC CORP	1- 6	4	+ 1/2	+14.2
A	POTTER INSTRUMENT	1- 5	1 3/4	0	0.0
O	PRECISION INST.	1- 3	1	0	0.0
O	QUANTOM CORP	2- 8	4 1/4	+ 1/4	+6.2
O	RECOGNITION EQUIP	2- 5	3 3/4	- 1/4	-6.2
N	SANDERS ASSOCIATES	2- 8	4 7/8	+ 1/4	+5.4
O	SCAN DATA	1- 2	1	0	0.0
O	STORAGE TECHNOLOGY	6- 15	9 1/8	-1	-9.8
O	SYCOR INC	4- 13	7 1/4	0	0.0
O	TALLY CORP.	1- 4	1 1/2	0	0.0
O	TEC INC	1- 7	3 1/4	0	0.0
N	TEKTRONIX INC	18- 48	30 3/4	- 3/4	-2.3
N	TELEX	1- 4	2	+ 1/4	+14.2
O	WANGCO INC	3- 13	3 3/4	- 1/8	-3.2
O	WILTEK INC	1- 8	2 1/2	- 1/4	-9.0
O	BALTIMORE BUS FORMS	4- 6	5	+ 1/2	+11.1
A	BARRY WRIGHT	4- 7	5 3/4	+ 1/8	+2.2
O	CYBERMATICS INC	1- 2	5/8	0	0.0
A	DATA DOCUMENTS	23- 54	38	+ 1/2	+1.3
O	DUPLEX PRODUCTS INC	6- 22	20 1/8	+ 1/8	+0.6
N	ENNIS BUS. FORMS	4- 7	6	+ 1/4	+4.3
O	GRAHAM MAGNETICS	5- 11	7 1/2	- 1/4	-3.2
O	GRAPHIC CONTROLS	6- 14	13 1/4	+1 3/4	+15.2
N	3M COMPANY	43- 79	53 1/8	-3	-5.3
O	MOORE CORP LTD	33- 57	48	+1 1/2	+3.2
N	NASHUA CORP	15- 45	15 1/2	- 1/8	-0.7
O	REYNOLDS & REYNOLD	6- 35	14 1/2	+ 1/2	+3.5
O	STANDARD REGISTER	10- 17	16 1/4	0	0.0
O	TAB PRODUCTS CO	4- 11	6	0	0.0
N	UARCO	13- 23	19 3/4	+ 1/2	+2.5
O	VANIER GRAPHICS CORP	3- 4	4	0	0.0
A	WABASH MAGNETICS	3- 7	4 1/8	+ 1/8	+3.1
N	WALLACE BUS FORMS	14- 24	19 3/4	- 1/2	-2.4

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR



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